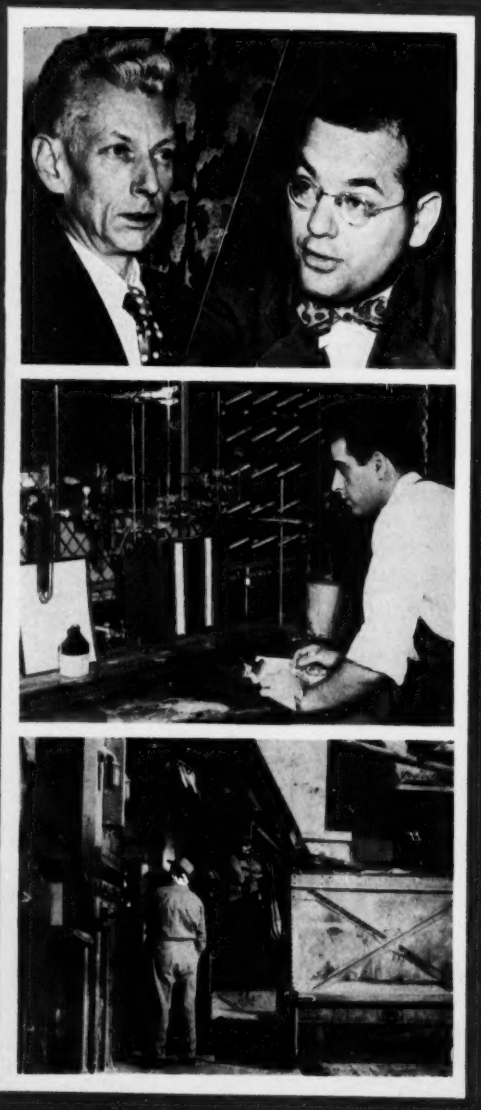
Chemical Week

April 11, 1953

Price 35 cents



Souders vs. Neidig: Will oil stocks keep outpacing chemicals or is a change due? . . . . p. 18

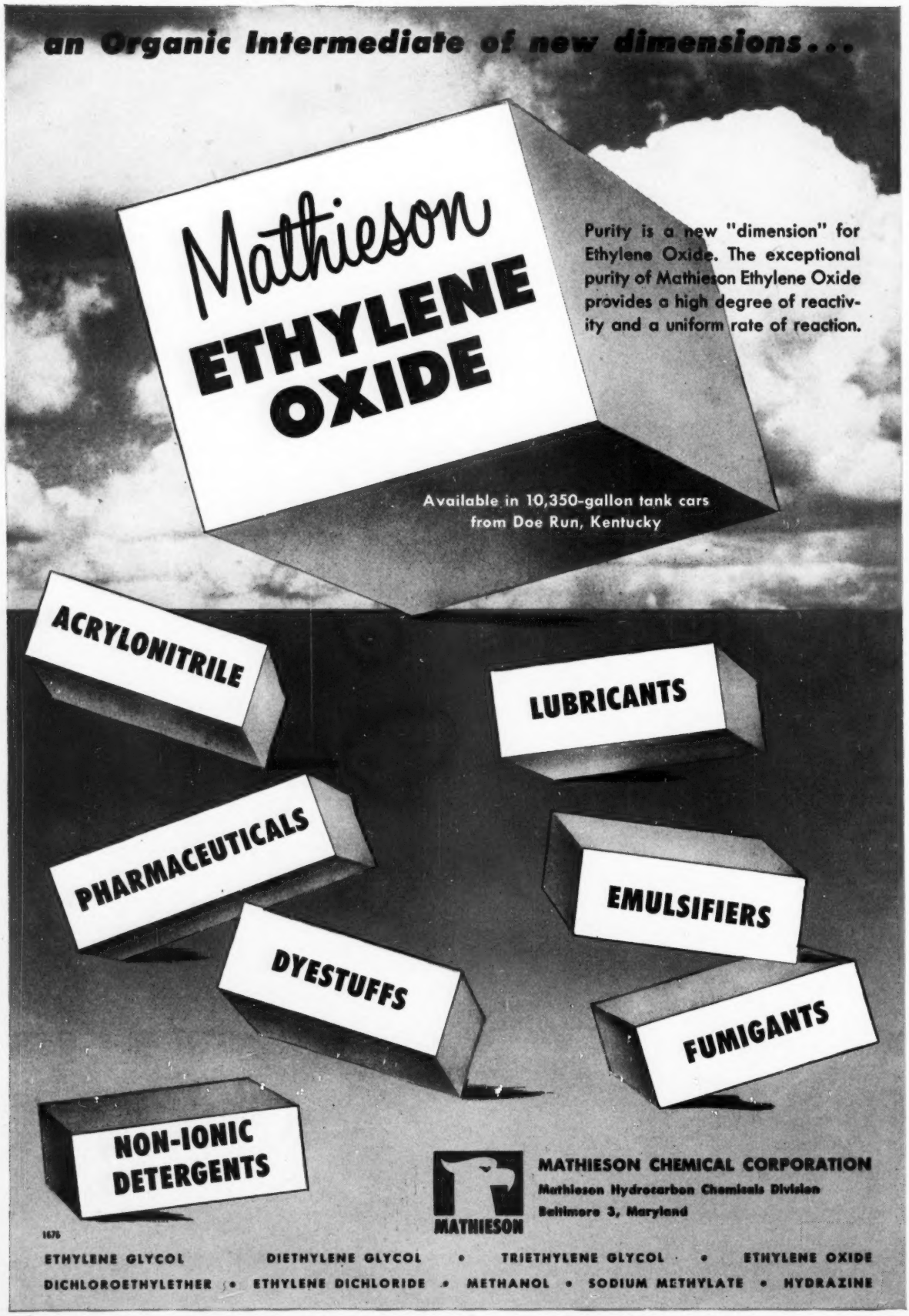
Target: Coal mines seek chemical formulations to seal off shafts, hold up roofs . . . . . p. 35

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Maleic has a new look: rise of polyesters, soil aids, other uses skyrockets output . . . . . p. 70

It's the little things that count: fertilizer formulators talk up trace elements . . . . . p. 74

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Chemical Week

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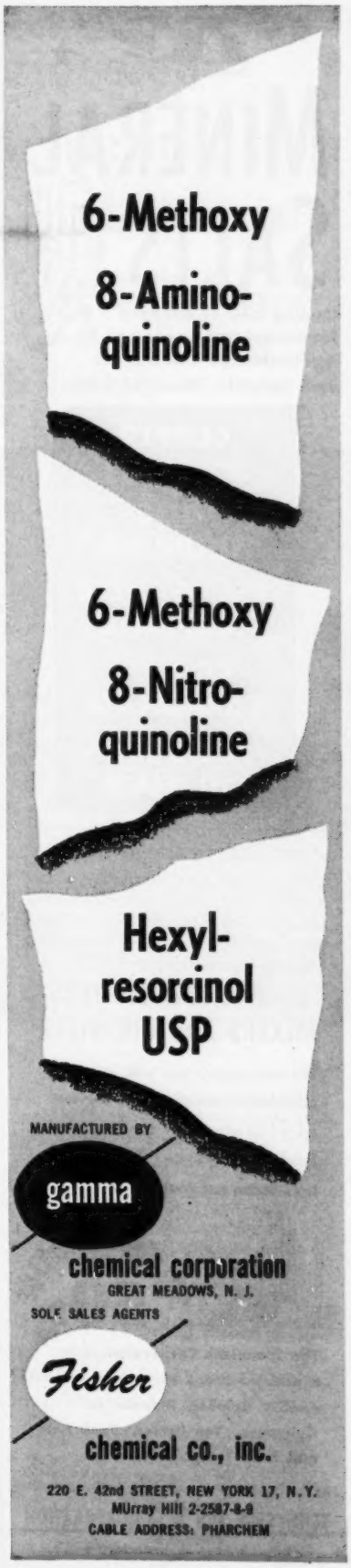
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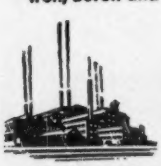
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OPINION . . . . .

Overzealous Down Under

TO THE EDITOR: Aware as I am of your infinite care in factual reporting, I was astounded to find (*March 7*) . . . the following statement under Sulfuric Acid/Australia:

"Work is to begin shortly at Port Adelaide, South Australia, on what is claimed to be the largest sulfuric acid plant in the world."

I realize that the boys "down under" are probably inspired with some of the contagious Texas spirit; however, what has happened to the 500-ton-a-day units of sulfuric acid in the United States, knowing that there are one in Baltimore and two in Texas of this capacity?

A closer reading of this article suggests that it should read "the largest pyrite sulfuric acid plant."

H. L. MARSHALL
Mathieson Chemical Corp.
Baltimore, Md.

Another for the List

TO THE EDITOR: Regarding the article phthalocyanine pigments (*Nov. 29*) . . .

We have complete manufacturing facilities for the manufacture of flushed phthalocyanine blue and green, and . . . we have been engaged in the flushing of these pigments for the past two years . . .

We are sure your readers will be glad to be acquainted with an additional source of these widely used materials.

MARK W. NEITLICH
Claremont Pigment Dispersion Corp.
Brooklyn, N. Y.

Stress on "Competitive"

TO THE EDITOR: . . . I read with interest the article entitled "Fissures in the Wall" (Mar. 14).

This article deals with a technical question regarding classification of products under the Tariff Act of 1930, as amended. It is . . . difficult for me to understand how you tied that interview into the question of extension of the Trade Agreements Act.

I consider that Mr. Fred Dehls did a very good job, but that he could have emphasized the fact that the American Selling Price base for assessment of duties under Paragraphs 27 and 28 applies only to competitive products.

This American Selling Price basis was created for the specific purpose of assuring the production and availability of organic chemicals essential to our national defense. Regarding products such as dyes, medicinals, pharmaceuticals and others . . . during . . . 1951 only 20% of the foreign invoice value of imports . . . fell under the competitive provision.

FRED G. SINGER
Development Dept.
E. I. du Pont de Nemours & Co.
Wilmington, Del.

Thank you, Reader Singer, for a significant extension of the ideas brought forward in our article. Pressed as we were by space limitations, we were not able, of course, to develop adequately all the phases of this complex subject. —ED.

Alabaman Acclaim

TO THE EDITOR: I have read with interest your news article on the development of McIntosh as a chemical center . . . It contains a great deal of invaluable information . . .

ARTHUR B. POPE
Executive Asst.
American National Bank and Trust Co.
Mobile, Ala.

Percent: 0.00

TO THE EDITOR: In your news article "Aminos Spell Opportunity" (*Mar. 7*) it was stated that gelatin is one of the sources of tryptophan . . .

The percent tryptophan in gelatin is 0.00 . . .

JOHN SPINELLI
Seattle, Wash.

Right, dead right, Reader Spinelli. Casein contains tryptophan; zein contain tryptophan; gliadin contains tryptophan; gelatin, alas, does not.—ED.

Wheat Aminos

TO THE EDITOR: Congratulations on your comprehensive news article "Aminos Spell Opportunity" (*Mar. 7*), and thanks for listing us as a producer of amino acids.

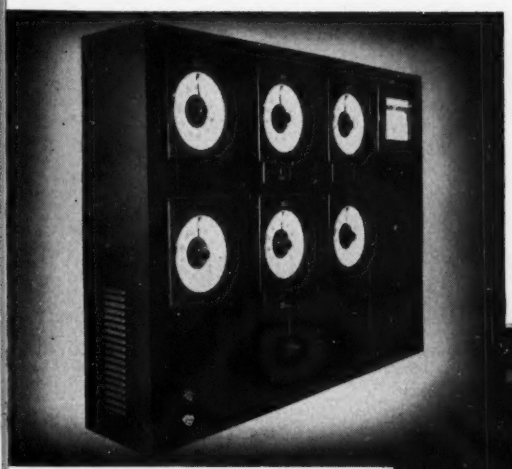
We were a little disappointed that you omitted our name as a manufacturer of monosodium glutamate, which we have marketed . . . since 1935.

We, too, are "taking more than an

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: W. A. Jordan, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

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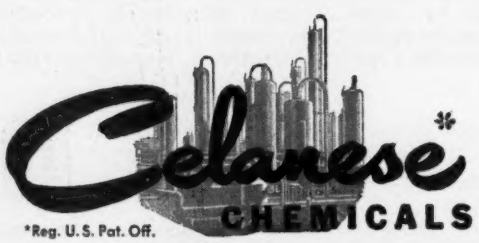
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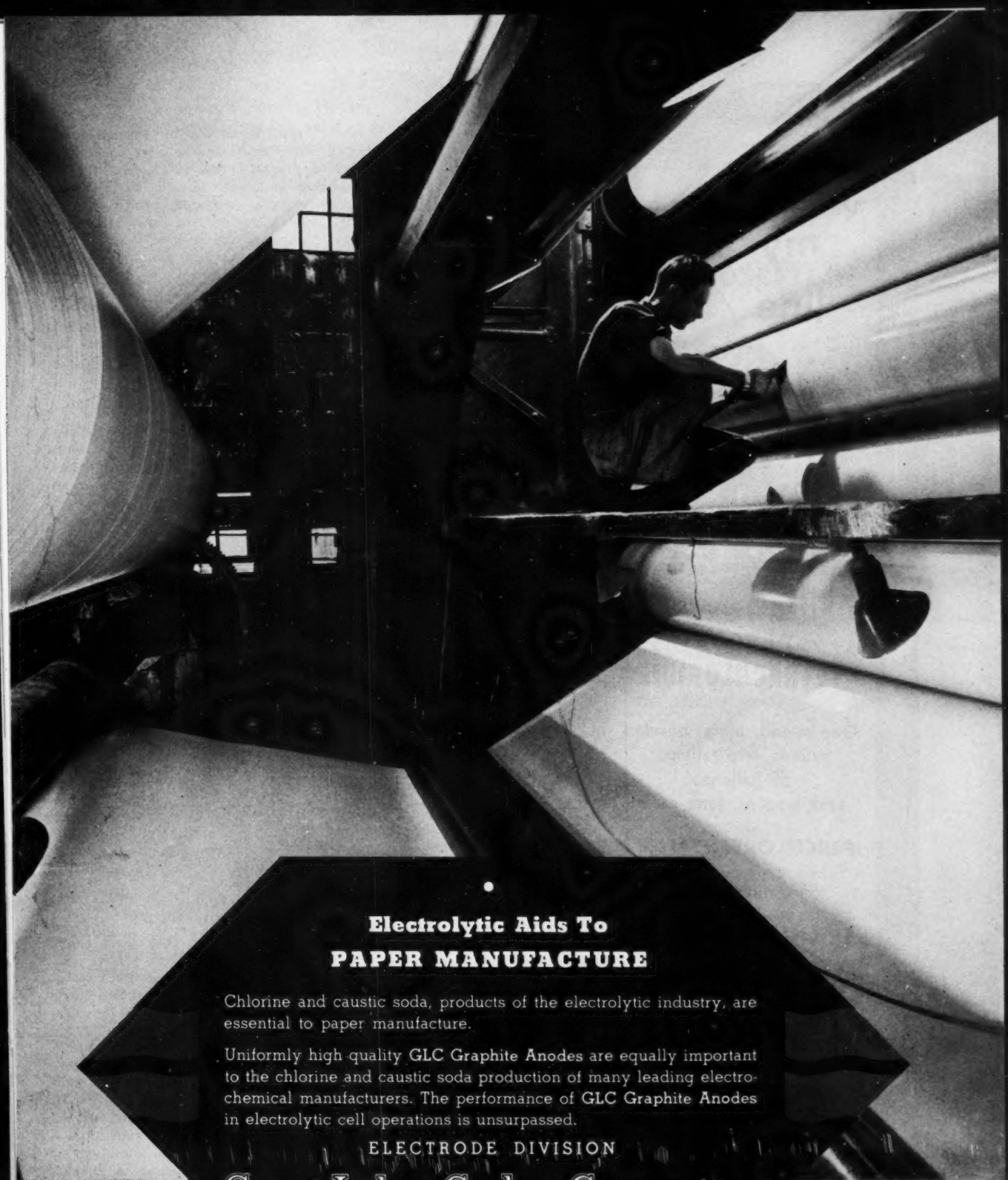
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B. F. BOWMAN
Vice-President
The Huron Milling Co.
New York, N. Y.

More, Other Aspects

TO THE EDITOR: Your tariff story "Fissures in the Wall" (*Mar. 14*) has appreciable interest in regard to the particular features that it covers.

I would like to suggest, however, that it would be desirable to publish other articles of this nature that would cover additional aspects of the tariff situation . . .

C. E. VAN WINCKEL
President
The Carwin Co.
North Haven, Conn.

Shocking Symposia

TO THE EDITOR: You, and other chemical magazines, have been soberly—I presume—reporting on various technical symposia over the years . . .

Perhaps you should take a look at the enclosed clipping from Ripley's "Believe It or Not" . . . [which says that "a symposium is literally a drinking party"] . . .

Shocking, what? . . .

RALSTON A. MCCORMICK
Houston, Tex.

Reels the Mind

TO THE EDITOR: This reader pleads for the complete elimination of *Time*-style.

When your writers feel tempted, make them read the *New Yorker* piece about Henry Luce, written by Wolcott Gibbs. It includes the comment, "Backward ran sentences until reeled the mind."

EDWARD L. GORDY
Standard Oil Co. (Indiana)
Chicago, Ill.

Right enough, Reader Gordy, but this we think is the nub of your complaint. Any group of editors develops, sooner of later, a method of reporting and interpreting the news that gives a magazine a personality and becomes its "style." And the caricaturists of any magazine—just as artists who caricature people—dwell upon one feature and balloon it out of proportion.

Thus Time *has been tagged as a devotee of the inverted sentence and anyone who departs from the subject, verb, predicate sequence is dubbed a "*Time*styler."*

We'll admit that the occasional inverted sentence does creep into CW—as it must in any unmonotonous writing. But, interestingly enough, CW has been compared, and not infrequently, not only to Time *but also to* Newsweek *and* Business Week. *Those three journals have substantially differing editorial concepts and there's an old axiom that holds that nothing can be like three differing things. The common denominator, we feel, is that all are interpretive newsweeklies, all are staffwritten—by people.—Ed.*

Over-trumped Texana

TO THE EDITOR: Lest those who are usually uninformed yet stand ever-ready to lambast all that is Texana be given grounds to criticize us as boasters—despite our tongue-in-cheek, self-inflicting style of braggadocio—please inform your readers that the plant investment, employees figures etc, etc., which I presented at MCA's Detroit Conference ("It's Up to Industry Now", *Mar. 14*) were not, as you suggested, for Houston and Harris County alone, but for the entire coastal strip, 100 miles deep, running from Brownsville eastward to Lake Charles, La. . . .

I am neck deep in difficulty with our able director of research—whose statistics I use. Again, pure recitation of the facts about Texas is usually enough!

DOW WYNN
Manager
Industrial Dept.
Chamber of Commerce,
Houston, Tex.

One Side of Picture

TO THE EDITOR: Your tariff story, "Fissures in the Wall" (*Mar. 14*) presents only one side of the picture. From the standpoint of the consumer, how much protection should the manufacturer of pharmaceuticals have?

With specific reference to theophylline . . . which was discussed . . . the domestic price for a very long time was held at $5.75 per lb. In August, 1952, this was reduced to $4.40 to meet foreign competition.

This same type of readjustment in price applies to a number of pharmaceutical chemicals within the past year. A basic question is: does the tariff wall protect the domestic manufacturer for a reasonable profit or for an unjustified markup on his product? . . .

W. STEINBERG
Physicians' Drug & Supply Co.
Philadelphia, Pa.

Do these additional applications of

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Alkyds from Tetrahydro Phthalic Anhydride polyhydric alcohols and castor oil as bonding agents and rubber softeners.

Chlorination of Tetrahydro Phthalic Acid to yield 4-Chloro Tetrahydro Phthalic Acid for making clear, light colored hard resins.

suggest possible uses as

laminating resins

bonding agents

plasticizers

rubber softeners

polymerizing agents

rubber additives

Send for technical bulletin I-1

Reference to these process patents and a very substantial amount of useful data on the properties and reactivity of Tetrahydro Phthalic Anhydride are given in our Technical Bulletin I-1. We will be pleased to send you a copy without obligation.

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NEWSLETTER

Wholesale revamping of the National Bureau of Standards for the first time in its 52 years' existence is in the works—and the atmosphere surrounding it seems right now to have the unpleasant but lamentably familiar odor of politics and influence-peddling.

Secretary of Commerce Sinclair Weeks has promised to take a long look at the Bureau's "functions and objectives," and make changes. First change: firing Bureau Director Allen V. Astin (see page 79).

But Weeks, regardless of his intentions, has opened a veritable Pandora's box of serious personnel problems. Rightly or wrongly, Bureau scientists fear that the Bureau is being made a political cat's-paw, are gravely alarmed by Astin's dismissal; and their concern has spread to other government bureaus, whose chiefs are anxious lest there be a mass exodus of scientists from government service.

Some time will elapse before the Office of Alien Property can even start to dispose of General Aniline & Film (CW Newsletter, Mar. 21), but prospective buyers are already queueing up:

- Blair Holdings Corp. says it has an agreement with Interhandel A.G.; and if the government relinquishes its grip on GAF, Blair will buy the Swiss firm's holdings for $60 million.
- An investment banking group headed by Merrill Lynch, Pierce, Fenner & Beane (the same firm that headed up the syndicate that bought Schering Corp.) is interested in GAF, won't make any commitment until the Interhandel litigation is squared away.
- Atlas Corp., the investment trust piloted by Floyd Odlum, is also not averse to putting its finger in the pie.

Government rubber officials are now sniping at private rubber companies, claiming they see an ulterior motive behind recent new-product and new-process announcements by Goodrich, Goodyear, Copolymer and others. The announcements were timed, they say, to coincide with the push for disposal—with the hope of cutting the asking price for government-owned facilities by making them appear obsolescent.

Plant growth via antibiotics? USDA scientists at Bellville, Md., have completed their first tests on terramycin as a growth stimulant.

In tests on hybrid corn, radishes and beans, scientists found little difference between experimental and control plants in germination and early growth rates. Temporary stimulation was found in only one of six corn experiments.

Says USDA: "Results of experiments completed so far fail to show that terramycin hydrochloride consistently stimulated the early growth of the plants studied." The department, however, plans more extensive tests this summer.

The RFC may be dying (CW, Mar. 28), but it is still issuing loans. Last week it made a $900,000 loan to Mississippi Chemical (Yazoo City) to pay part of the cost of Mississippi's $4.75 million expansion in anhydrous ammonia, nitric acid and ammonium nitrate.

There's an honest-to-goodness pot of treasury notes at the end of every Western rainbow. That's the implication of demands to be pressed this summer by the left-wing International Union of Mine, Mill and Smelter Workers in its negotiations with Anaconda Copper, Kennecott Copper, American Smelting & Refining, and Phelps-Dodge Copper.

The pie-in-the-sky proposals include an employer-financed national, occupational disease ("especially silicosis and lung cancer") fund to be jointly administered by the union and industry; $50-a-week sickness and accident benefits starting the second day for any disability, whether industrial or nonindustrial; establishment of a 6-hour day and 30-hour week, with premium pay for Saturdays and Sundays; increased shift differentials; $125-a-month minimum pension benefits; and, of course a general 15¢/hr. wage hike.

There'll soon be North American Terylene as well as Dacron. Imperial Chemical Industries, which holds the non-U. S. rights to the polyester fiber, plans a plant at Millhaven, Ont., large enough to satisfy Canadian demands. DuPont makes the same fiber in this country under the Dacron trade name.

The plant will be built by a wholly owned ICI subsidiary, but after Canadian Industries Ltd., is split up, the facilities will be offered to the ICI-owned successor company.

In another move significant to U.S. industry, ICI has modified its offer to supply know-how manuals and technical assistance to U.S. licensors of its polyethylene patents. It will still license patents and provide manuals, but it will not—at least for the time being—handle requests for technical assistance. Reason: it has taken on as many jobs as it feels it can handle.

Also of foreign-cum-domestic interest is the upcoming sale by the Office of Alien Property of its seized 50% share of Jasco, Inc.—a firm with offices in New York and Elizabeth, N. J., nine licensing agreements, and several hundred patents, but—in accordance with the sales terms—no chance for growth.

Jasco was formed in 1930 as a joint Standard Oil Development-I. G. Farben enterprise to test and license petroleum processes developed by the parent companies. I. G. Farben's share was seized in 1942. It's strictly a patent holding and licensing organization; but its 228 U.S. patents on butyl rubber, styrene, butadiene, acrylonitrile, etc., are licensed to Esso Standard Oil, B. F. Goodrich, Gulf Oil, Koppers, Monsanto, Dow, and Reconstruction Finance Corp.

Bids—for cash purchase of OAP's entire 50% share—must be submitted by April 30. It will be sold only to U.S. citizens or citizen-controlled firms agreeing:

- Not to assign any new patents to Jasco.
- Not to permit Jasco to do anything but license patents.
- To require any subsequent buyer to accept the same terms.

Will use of lie detectors increase loyalty and security? The Atomic Energy Commission, which has used it for periodic screening of several thousand Oak Ridge employees (CW Newsletter, Dec. 29, '51) says no. It will stop using the polygraph except on a voluntary basis in specific cases because "the cost in dollars . . . in employee morale . . . substantially outweighed the limited advantage." Moreover, AEC found that the machine can't uncover potential saboteurs or sympathizers with subversive movements.

. . . The Editors



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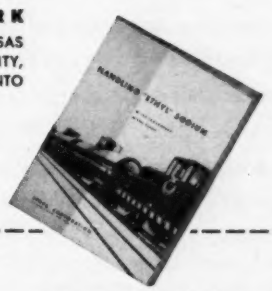
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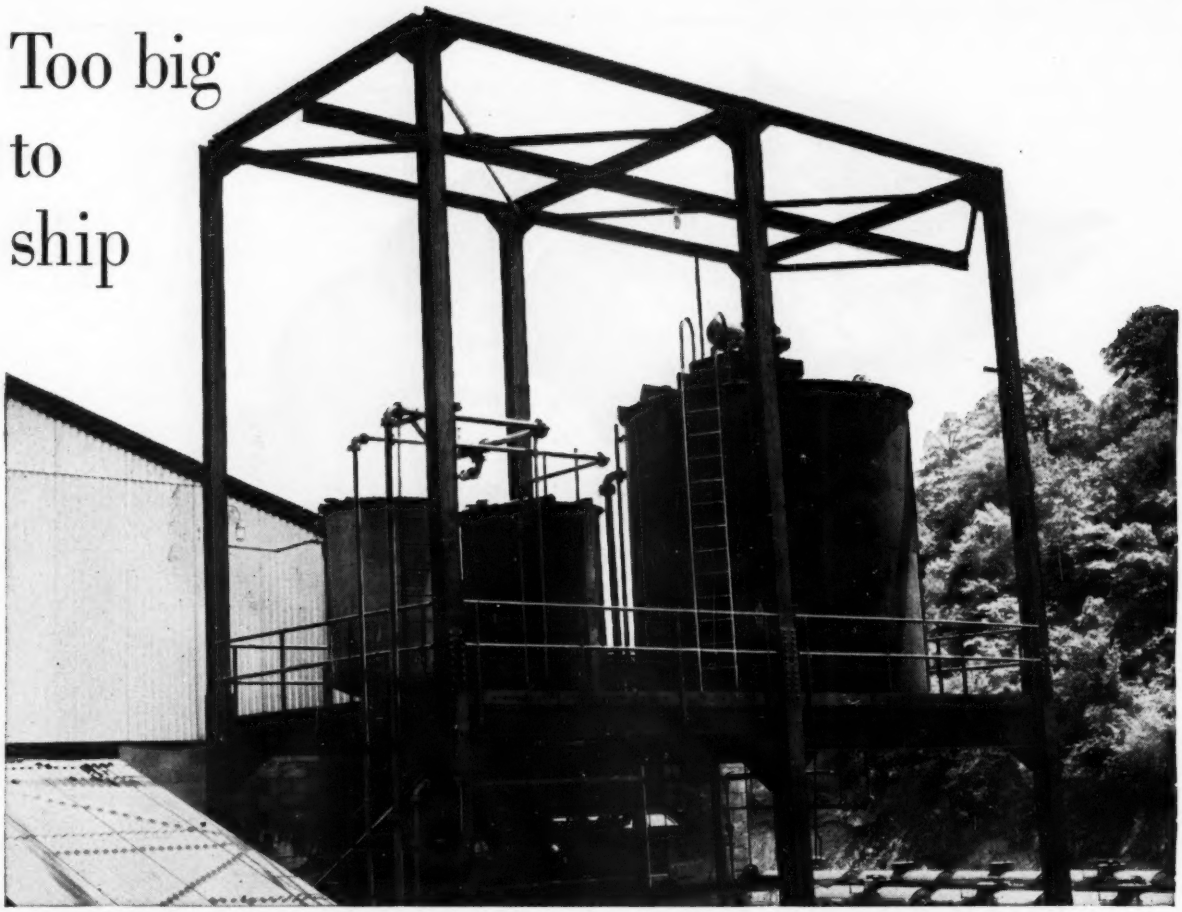
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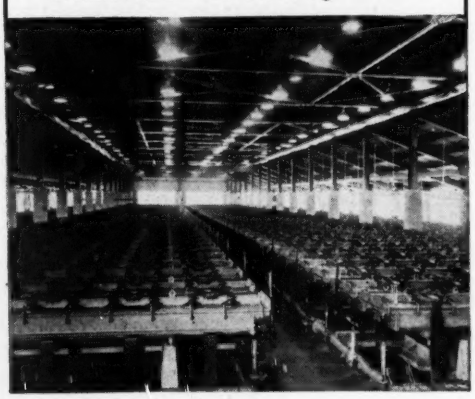
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BUSINESS & INDUSTRY . . . .

Top Brass Takes Over

No longer a minor chore to be tossed to the company's youngest and greenest engineer, air and stream pollution now are regarded as a major industrial problem not below the dignity of the firm's best brains.

Rising importance of this subject to chemical and other manufacturing concerns can be seen in numerous dedevelopments from coast to coast in recent weeks:

- At least 8 state legislatures are considering bills for pollution control.
- In dozens of cities, public officials



PENNSALT'S MITCHELL: To management, pollution problem looms larger.

and boards are taking a crisper, less tolerant attitude in enforcing antipollution ordinances.

- At conferences on pollution control, there's an increasing number of speakers and delegates from the "front offices."

Among speakers at the annual meeting of the Air Pollution Control Assn. in Baltimore, May 25-28, will be William F. Mitchell, vice-president in charge of manufacturing for Pennsylvania Salt Mfg. Co., whose subject will be, "Management Considers Air Pollution." Champion Paper & Fiber's chairman of the board of directors, Reuben R. Robertson, was a principal speaker at last month's second annual Southern Municipal & Industrial Waste Conference in Chapel Hill, N.C.

Scope of this problem was summed up at that conference by Milton O. Schur, research and development manager for Ecusta Paper Corp.:

"To responsible industrial management, the abatement of pollution is a social, technologic, economic and political challenge."

Dyestuffs Dilemma

General Dyestuffs Corp., which along with General Aniline & Film has long been the subject of court litigation, this week was involved in another suit. Subject: trade secrets, confidential information and alleged pirating of workers.

GDC has asked $6.2 million damages in a Federal Court suit against Verona Chemical (Newark, N.J.), its officers Ernest K. Halbach, William L. Swenson and 11 others. Relationships between plaintiff and defendants are complicated—Halbach was once GDC president; Swenson, its former sales manager; the others, individuals whose length of service with GDC had ranged from 10 to 55 years. Verona itself was once in the GDC orbit. It had been jointly owned by GDC (49%) and Halbach (51%).

In its petition filed in New Jersey District Court, Dyestuffs charges that competition from Verona's dyestuffs division—established in Feb. '53—has already "materially reduced" GDC sales of fast textile colors. Future sales could do "irreparable harm."

Halbach, Swenson and Verona did this, GDC states, by hiring away its technical personnel, using "confidential data and trade secrets . . . in violation of the defendants' implied contract" with GDC. In addition, Verona and its employees are charged with appropriating Dyestuffs' good will, and with circulating statements that would destroy its reputation and would "induce others not to deal with or work for" General Dyestuffs.

GDC also asks injunctions against further "illegal acts."

In Reply: Halbach, in Washington testifying at a Senate hearing on the relationships between GAF and GDC and the Office of Alien Property, termed the suit "an awfully childish thing." Said he: Verona was in no position to offer "serious" competition to GDC; it had been making dyestuffs only about a month; as yet, it has made no large-quantity sales.

He also questioned the piracy charge. His thesis: the 12 left General Dyestuffs voluntarily to join his concern's new dyestuffs operations. That they would give up their pension rights, he averred, did not speak well for morale in U.S.-operated GDC.

Halbach, employed by General Dyestuffs as president or as general manager for most of his 25 years of service, received as a result, a monthly pension of $257.34.*

Other Actions: Both General Dyestuffs and the corporation for which it sells, General Aniline & Film, have been tangled in litigation ever since the U.S. government seized them in the 1940's as arms of Germany's I. G. Farben trust.

Before the war, Farben interests held options on GDC stock—"credit protection," Halbach reports. Such options were cancelled, he has said, when he obtained majority control of the company in 1939, the year war broke out in Europe. On Dec. 6, '40, his stock was transferred to an irrevocable family trust, which held it until it was seized as alien property.

In 1944, the Halbach interests sued the government for return of the stock, but settled out of court by accepting $557,000. The suit was then dismissed "with prejudice"—a legal phrase that means that since the facts of the case have been considered, it cannot be tried again. In 1951, however, Halbach entered a motion to vacate judgment and set aside the settlement. This was denied, but an appeal is still pending.

Until final settlement of this suit, the government can't sell GDC. Since its title to General Aniline is also disputed, a delay seems likely here.

Congress, however, has been asked to amend the seizure statutes to allow sale of companies such as GAF and GDC before final adjudication of court claims. And right now, this seems the only route to a quick return of the companies to private management.

* In 1950, when he retired from GDC, the company board of directors awarded him an extra payment to supplement this honorarium. With this payment, his monthly income from GDC and through social security totaled $1,500. The additional payment was suspended in Jan. '53.

They Run Their Business—Not Vice Versa

No hard and fast rules for forming your own company are effectual; hard work, problems, blunders are part of the cost.

The odds are heavily stacked against you; to weather the storm you need a port of retreat.

Forming your own company is a time-consuming, energy-sapping, capital-devouring business, agree three who have tried it. The odds are all against success. But, if you make the grade, the rewards and end results are, they also agree, well worth any personal or financial sacrifice.

The experience of one man, T. E. Wannamaker (who founded T. E. Wannamaker, Inc., in 1937 in Orangeburg, S. C., on a $12,000 shoestring) is convincing proof. His initial objective: to produce *p*-phenylenediamine. Before long, business blossomed out to include the manufacture of *p*-nitraniline, and then, under the shadow of World War II, tetryl.

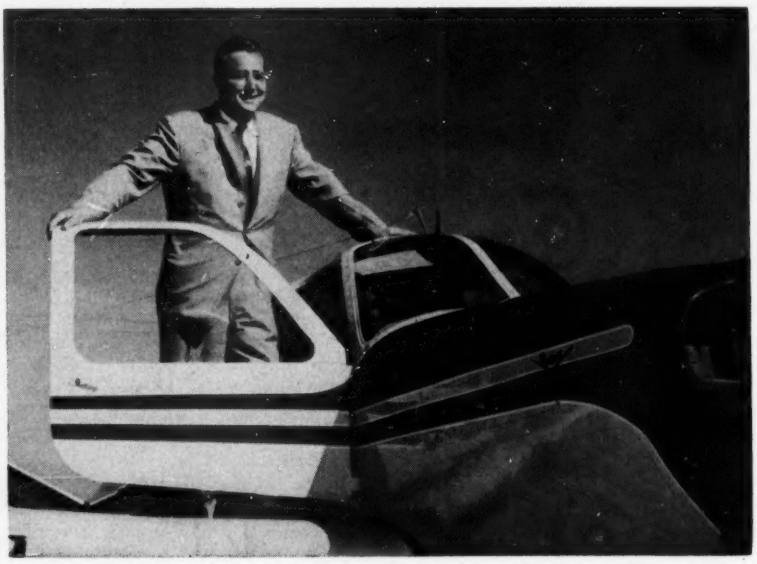
Accurately forcasting tetryl's limited market in peacetime, Wannamaker formulated his "fox hole"—a long-range plan for postwar conversion involving the production of various chemicals on a custom basis. This ace in the hole was later extended to embrace process and pilot-plant development.

On Feb. 2 '53, Wannamaker's fixed assets were transferred to former stockholders, and profitably sold to a major purchaser. With this chapter closed, the founder reminisces. "It is time to look back over the years; to attempt to analyze the problems faced, the decisions made, and to recognize the errors that could have caused failure."

How It's Done: Rules and regulations on going into business are impossible to abstract. But, opines Wannamaker, anyone stepping in today would do better "to purchase a going concern with a record of profits and expand the facility by dint of effort; it's cheapest, safest, and, in the long run, the quickest method."

If you start from scratch, though, your best bet is knowledge of sales—necessary because small firms have limited working capital. "Knowledge of markets and accounts is the best insurance for the small manufacturer." One ingenuous individual, recalls Wannamaker, made it a point to sell stock in his venture to prospective customers, thus giving stability to his accounts.

Most of today's industrial giants started in this manner: conception of an idea (the product) followed by a thorough investigation of markets and process, and then organization. Putting the cart before the horse (organization preceding market research) courts disaster; funds are hardly ever sufficient to last until the paper work begins to pay off.



WANNAMAKER: "Adequate capital . . . twice the amount that can be raised . . . can be approached, but never reached."

With the idea in hand, the course set, and the money raised, the "mechanics are simple." Avoid the "purchase of red ink" and beg, borrow or "steal" competent management. "Adequate capital is primary," asserts Wannamaker. "According to Dun & Bradstreet, inadequate capital is the single cause of over 90% of all failures."

Examples of the woes of inadequate backing are numerous: "Dow lost two companies in this manner; and after 32 years on the Brandywine, Du Pont is reported to have owed far more than its profits from powder."

Like adequate capital (defined by Wannamaker as twice the amount that can possibly be raised) adequate management is seldom realized in a small venture, "primarily because early beginnings fail to support it." His own experience in the early '40s is recalled: "I had procured a million-dollar contract for tetryl. With the exception of my own technical training, management consisted of one musician, one shoe salesman, one truck driver, and several displaced car salesmen and filling station attendants. The benefits of ignorance are amazing."

Moreover, small business suffers greatly from the limited resources of technical manpower. And, unfortunately adequate technical help is even more necessary in the small company than in the large industry because of "required innovation in processes due to limited capital."

The dangers of "disregarded" sales and markets are a continuing peril. "Over-estimation of market potential on phenylenediamine almost caused our downfall in the early days," admits Wannamaker.

Then There's Lady Luck: Even with these three essential requirements fulfilled (adequate capital, management, sales) Lady Luck wields a big stick. To succeed, the small concern must be pliant; markets can, as Wannamaker recalls, turn the tables and displace a product ("which made us think we were eating high off the hog") completely from sight.

By the very nature of its being, the large organization suffers from several structural disadvantages; the small company from others:

• Because of the teamwork nature of its methods, individual effort is not clear-cut in a large organization. The result: a feeling of nonaccomplishment, which leads to a burning desire to gain a position "where the job will rise or fall dependent upon individual decisions."

• By nature, a large corporation suffers from some inefficiency due to deadwood and free riders. This is discouraging to the person carrying the load, may be the greatest single reason why "within the fields of competition, the smaller concern can trounce the larger."

• Flexibility and speed of action is



RICH: "Primary and still-first loves—creative research and consultant work."

virtually impossible in a giant. This, states Wannamaker, is quite a sales point in new products.

• On the other hand, capital is far easier and more cheaply raised by the large venture. Due to limited capital, large projects are prohibited the smaller cousin; his fields of endeavor are limited.

• "Our so-called planned economy," warns Wannamaker, "is an ever-increasing burden to be borne by small industry." The very complexity of doing corporate business today requires specialists of all types—on taxes, financing, legislation, wage and hour scales and the like. This "super-cargo" is denied the small company; it must sink or swim as best it can.

• Another handicap: big business gains its stability through diversification, which tends to smooth the overall business cycles peculiar to a particular commodity. Wannamaker's approximation was to enter the custom conversion field, through which, before sale, "we had produced items in practically every field known to chemistry."

• Lastly, "taxation is a big burden to the smaller company, which depends more on plowing back profits for growth." The corporation can borrow in the world's money markets for expansion wherewithal; its less fortunate counterparts must scramble for cash.

"Yet the experience of forming one's own company is valueless," muses Wannamaker. "I would not swap it for anything material in this world."

Different Course—Same Finish: Rich-Roth Laboratories of Hartford, Conn., has followed a different pattern, used its consultant activities as a safety valve for its own internal research and development work. Founded in 1950 by Stanley Rich and Wilfred Roth (electrical engineers and physicists), its initial product, the Ultra-Viscoson *(CW, April 19, '52)*, was sold to Bendix Aviation Corp. on Feb. 13, '53. "Almost immediately the new instrument, which uses ultrasonic energy to test the flowability of liquids, proved to be a case of the tail wagging the dog," recollects Rich. The little "dipstick," which continually measures, records, and controls viscosity by means of a metal probe carrying pulses of ultrasonic energy, turned the firm's activities into a full-scale manufacturing venture.

Volume production led to sales meetings, trade conventions, consultations, plagued its developers with so many big business headaches that Rich-Roth Laboratories was literally being smothered by its offspring. The heavy demand throughout the chemical, petroleum, plastics, rubber and other fields forced Rich and Roth to work 14-hour days, stole time from other goals.

"Yet," avers Rich, "it accomplished our purpose," Hard work, long hours, and concentrated effort on the Ultra-Viscoson have built a reputation (by tangible proof) of technical competence in the industrial process control field. The period of its development and manufacture, moreover, has expanded Rich-Roth facilities in equipment, trained personnel, and know-how in many phases of the industry.

Now free to expand their "primary and still-first loves—creative research and consultant work," Rich and Roth look back on the road to success. Their path was similar to Wannamaker's, yet unique in its safeguard:

• Both men had experience in the high-level electronics work of World War II, had mutual interests in ultrasonics and automatic process controls. Pooling their savings—"a modest amount of capital"—they set up the laboratories "to engage in research and to put some of their pet theories to work."

• Their first major decision—to throw weight behind the development of a machine to continuously and accurately measure and record "flowability"—(for which they had previously determined a market) led them to build up a body of industrial requirements.



ROTH: ". . . balancing production, sales, research with two arms . . ."

• Ideas were pooled in an attempt to solve the problem; it was worked out experimentally and practically.

• Field-testing was accomplished with a minimum of fanfare, serving the dual purpose of not alerting competitors and allowing the scientists time to iron out "bugs" before production ran rampant.

• Only when the reception of the instrument was assured did Rich and Roth turn to organizational problems. A sales manager, a few technicians, and a physicist were hired; prices were set at a level "reasonable, yet not encouraging competition." Fourteen months' start had been gained on all comers.

• By 1952, the infant was on its

own—ripe for vigorous marketing. Wide-spread publicity and advertising campaigns were initiated; offers for purchase were considered. Bendix's "attractive" offer—brewing for some months—wrote finis to time-demanding production; Rich-Roth's Ultra-Viscoson was sold outright.

Financial footing, industrial recognition, organizational foundation and wide general experience were the fruits of the labor.

Ace in the hole for Rich-Roth Laboratories is that their consulting business—the initial purpose behind their alliance—is now firmly grounded.

COMPANIES . . . .

In the shade of Allied Chemical & Dye's $200-million, 25-year 3½% debentures offering (*CW, Feb. 14, '53*), other stock offerings were made this week:

• Stockholders of the Beryllium Corp., Reading, Pa., have approved an increase in the authorized common stock from 200,000 shares to 800,000 at no par value. Also confirmed: the elimination of the authorized 5,000 preferred shares, all retired. The additional common stock is reported to be needed for expansion and modernization.

• Crown Zellerbach Corp. has decided to proceed with its proposed offer of exchange to the stockholders of St. Helens Pulp and Paper Co. Terms: one share of Crown Zellerbach common for each one and one-sixth shares of St. Helens. In anticipation of the move, Crown Zellerbach is in the course of effecting a two-for-one split of its common stock, which will take the form of a dividend distribution Apr. 24.

EXPANSION . . . .

Plant Food: International Minerals & Chemical Corp. will build a factory at Clarkesville, Tenn., to produce plant food mixtures. Capacity: 20,000 tons/year; due in by next fall. Also, International's plant at Somerset, Ky., will be doubled in size, company officials say, marking the second time the plant has been enlarged since 1948.

•

Nitrogen: Grace Chemical Co. will begin construction of a nitrogen plant near Memphis beginning in May. The Foster Wheeler Corp. has been named to complete the $19-million project. Operations are expected to begin by the summer of 1954.

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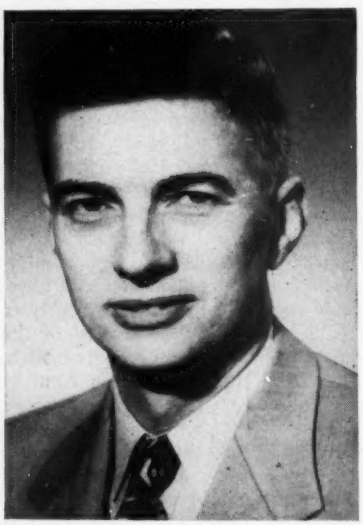
Aluminum Foil: Reynolds Metals Co. plans to spend $3.5 million to restore a plant in Louisville, Ky., to handle all steps involved in aluminum foil production. The project will start as soon as modernization plans have been completed.

•

Asphalt: Allied Chemical & Dye Corp.'s Barrett Div. will install (before the end of April) a pipeline to carry asphalt from company barges on Onondaga Lake to its plant in Syracuse, N.Y. The pipeline, mainly above ground, will be paired with a steam line from the Barrett boiler plant to keep up the temperature of the asphalt in the barge tanks and in flow.

Wage Drive Mobilizing

Its financial structure strengthened by its members' recently declared willingness* to pay 25% higher dues this year, the United Gas, Coke & Chemical Workers of America (CIO) is launching its "build the union" program with a move that looks like one step toward industry-wide bargaining. Meeting in Washington last week, Gas-Coke's executive board voted to set up a system of industry-wide councils, intended to assure closer cooperation and mutual assistance in bargaining and other activities of local unions.



GAS-COKE'S SWISHER: Old tactics for new fields.

This plan, says union President Elwood D. Swisher, is the first concrete action taken to fulfill the 1952 convention's demands for greater efficiency of the locals, stepped-up organizing drives, and spreading of gains won in one segment of the industry to other branches.

Five Councils Forming: A council in each of these five fields will be set up by the men named by the executive board as coordinators:

• Paints and pigments (Samuel Angelocci).

• Pharmaceuticals, drugs and cosmetics (Jack Curran, District 3 director).

• Zinc and lead (Elwood B. Hain, District 9 director).

• Gas utilities and coke by-products (Joseph Appelbaum, District 8 director).

• Atomic energy (Roberts Buchannon, District 5 director).

The council idea is Swisher's pet. Members of his union were impressed with the workings of the Carbide & Carbon council, which he headed before his election to the top union post last year. Successful on a large corporate scale, the scheme now will be tried out nationally.

Pooling Information: The Carbide council holds about four meetings a year, at which representatives of locals in Carbide & Carbon chemical plants air any gripes and try to benefit from each others' ideas. This association of locals is supposed to help iron out problems faced by all or by just one or two locals in the various divisions of Carbide & Carbon.

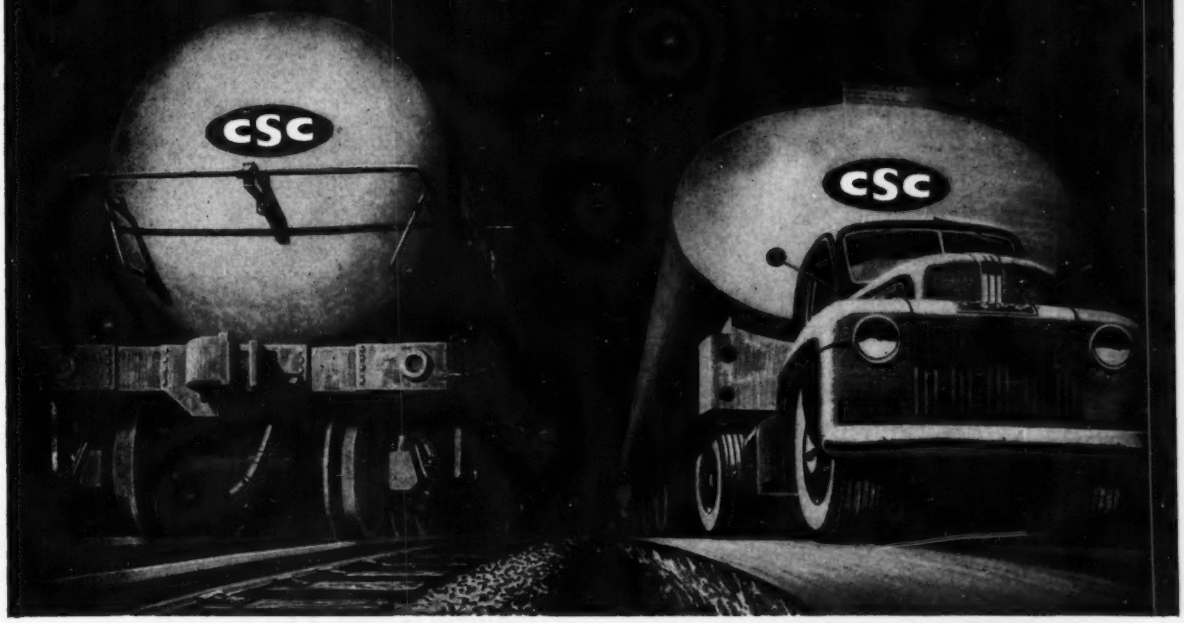
Swisher, of course, will act as a sort of "coordinator of the coordinators" under the new plan. He plans to get local conferences under way as the first step in utilizing the machinery. Gas-Coke thinks the plan will pay off this way, among others: where corporate divisions could keep individual locals pretty much in the dark about bargaining facts in other divisions, council meetings will now afford opportunity to "break secrets" if they exist and use such facts elsewhere to advantage.

Thus the councils undoubtedly are to play a big part in the union's drive to step up organizing activities. Coupled with this new system will be the 25¢/month dues increase, which Swisher hopes will provide more organizers, a bigger national staff, and give the union's research and educational program a shot in the arm. All are vital parts in any drive to organize.

* With returns in from 86% of the membership, voting was about 3½ to 1 in favor of boosting the monthly per capita tax from $1 to $1.25, according to Secretary-Treasurer Cecil Martin.

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SHELL'S SOUDERS: "Put your money in oils."



WHITE WELD'S NEIDIG: "For growth, chemicals."

1. **Over the past 15 years, stockholders in petroleum companies have fared better than the stockholders in chemical companies . . . dividend-wise.**
2. **The wide spread reputation of chemical concerns as growth companies has caused their stocks to be bid up far beyond asset values.**
3. **A stockholder in an oil company has a growth potential one and four-fifths as great as the stockholder of a chemical concern.**

1. **The petroleum industry has been sheltered tax-wise over the bulk of the past 15 years; the chemical industry has been penalized by EPT.**
2. **Chemical prices have been held down; crude oil has soared 165%.**
3. **Future expansion in the petroleum industry is limited by the U. S. consumption level of present-day products. Chemical industry's future is bounded only by the ingenuity of its researchers.**

For Investment: Oils or Chemicals?

Like any investor, the prospective stock buyer is primarily concerned with what he stands to gain through future growth and earning power of his purchase, based on present values. Can such a choice—when it pits oil stocks against chemicals—depend on past records?

Shell Chemical's Mott Souders says it can, claims "we would be safe in assuming that the next 15 years should reflect the performances of the chemical and petroleum companies in the past 15 as closely as anything would in this uncertain world."

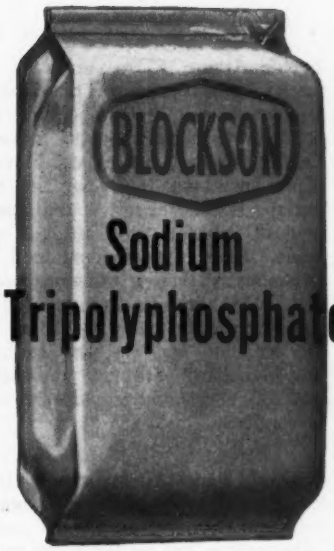
White Weld's Pete Neidig says it can't, sees the "growth of the petroleum companies, earnings over the same period as due to a combination of circumstances that are not likely to be repeated in the next decade."

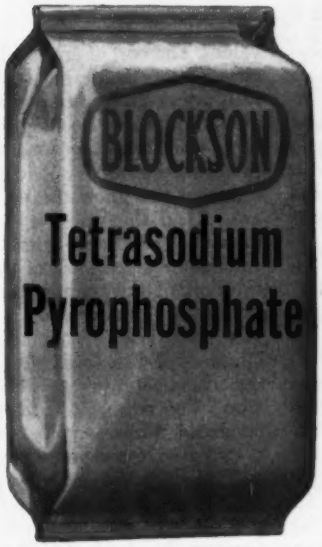
Plugging Oils: In his analysis, Souders hand-picks 12 petroleum, 10 chemical companies,* and charts the "fate of a hypothetical $100 invested in each industry in 1936. Today his investment in the petroleum companies "would be worth $201, with an additional $64 having been paid out in dividends; the chemical stock would bring $155, plus $52 dividends.

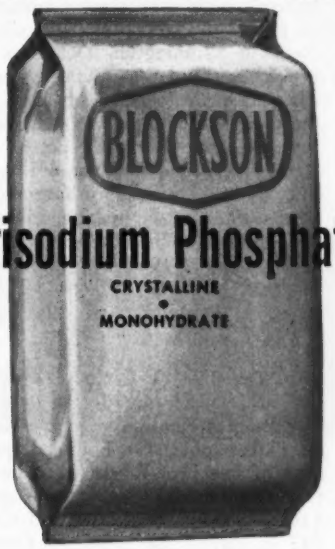
* Chemical companies: Air Reduction, Allied Chem. & Dye, American Cyanamid, Commercial Solvents, Dow, Du Pont, Hercules Powder, Mathieson, Monsanto, Union Carbide. Petroleum companies: Atlantic Refining, Cities Service, Gulf, Lion Oil, Ohio Oil, Phillips Petroleum, Stand. of N.J., Stand. of Calif., Stand. of Ind., Texas Co., Socony-Vacuum, Shell Oil.

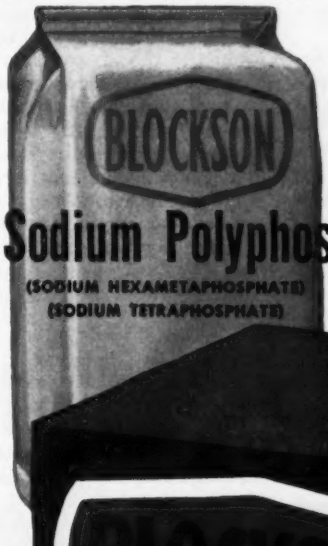
This he points out, is a much better criterion for the stockholder than the selection of a "so-called growth stock in the chemical industry" based on the Federal Reserve Board's index of physical production (which credits chemicals with an annual growth of 8% since '36, oils with only 5%).

Moreover, a company's rate of return on capital "is not a decisive factor in its selection." (Here chemical companies again take the lead, averaging 13.4% of net worth as against 10.3%.) Rather "a clue to the decisive factor of true growth can be found in the dollars of capital available per dollar of investment at the market price of the particular stock in ques-

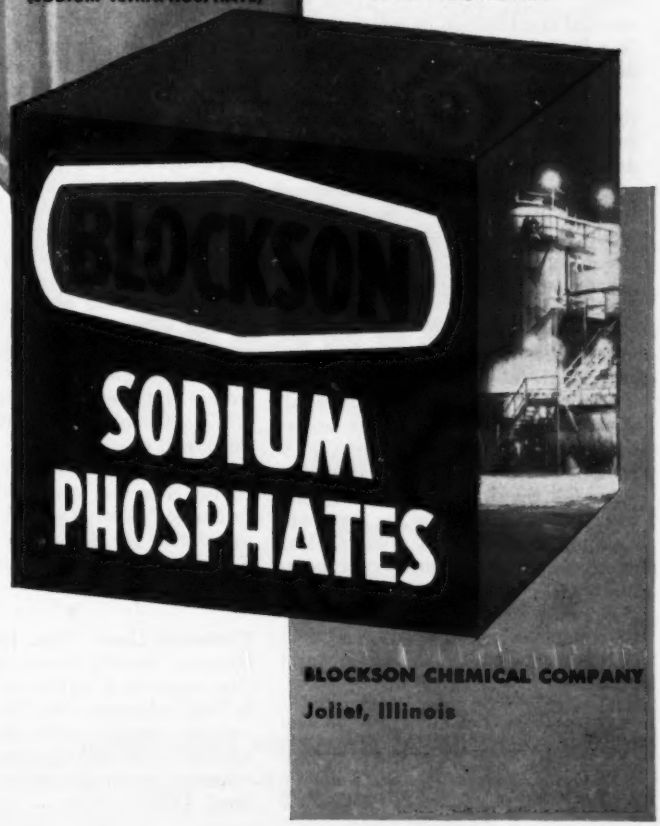








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tion." His proof of oil's superiority: $1 invested in petroleum will buy an average of $0.90 of assets; $1 invested in chemicals will buy a meager $0.40. Thus, the investor in oils can buy the assets of these "going businesses" at nearly book value; the chemical investor foots a 200-300% premium.

Finally, tossing his figures into a compound interest formula, Souders determines a "growth potential" figure that shows oils way ahead. Judging from 1936-1952 returns, "the stockholder in the oil companies has a growth potential one and four-fifths times greater than the chemical stockholder."

Backing Chemicals: "A critical review of the records over the past 15 years," retaliates Neidig, "would indicate that the best investment today for long-term growth appreciation is chemicals."

Stamford Research Institute's figures† showing comparative investment records by industry groups give petroleum only a slight edge—2½%—in earnings per share since 1935. But "any attempt to project a future pace based entirely upon the past is a risky business—especially in this case."

During the past 15-odd years, reasons Neidig, the U.S. has been involved in one major war and a so-called "police action in Korea"—an unusual combination of circumstances "not likely to be repeated in the next decade."

• Demand for petroleum skyrocketed (as did that for chemicals). Sales boomed, but "the petroleum industry has actually been sheltered taxwise compared with the chemical industry. Today 27½% of income from crude production is tax-free due to percentage depletion; all drilling expenses can be written off as tax deductions."

On the other hand, the chemical industry has been severely penalized, particularly by the excess profits tax, according to Neidig. Practically all chemical companies paid sizable excess profits taxes in 1951; some, such as Du Pont, Hooker and Hercules, again felt the drag in 1952. It doesn't seem probable that the tax laws will continue to work such disadvantages upon chemical companies in the future.

• Prices have also cut back chemical companies' net profits, curbed dividends, and resulted in lower asset values. The cost of crude oil has spouted a healthy 165% since 1936; chemical prices have been permitted to climb only 62%. Looking into the future, one can venture that "crude prices may go up," but it is not to be expected that their rise will be meteoric. "And the price of crude oil is extremely important to the petroleum companies, since most of them derive the bulk of their profits from production, rather than refining."

• And lastly, concludes Neidig, "there is a basic difference between the chemical and petroleum industries." The petroleum companies have one basic product—crude oil—and from it they derive end products.

The chemical industry takes "a multitude of raw materials—makes thousands of intermediates, finds end uses in hundreds of thousands of finished materials." Expansion, on the one hand, is fairly limited by the ability of the U.S. to consume increased quantities of gasoline, furnace oil, etc. But in the chemical field, future growth "appears only to be limited by the ability of the research chemist to develop a continual flow of new products, fresh uses."

Take your choice: Are past records or are future predictions "reasoned from a critical review of the past" to guide the prospective stock investor?

† SRI's table shows that if $1,000 had been invested in each of 24 petroleum companies on Dec. 31, '35, the average value of the stock, plus cumulative interest as of Dec. 31, '50, would have been $4,760. Similarly, $1,000 invested in each of 16 chemical companies would have amounted to $4,640.

LEGAL

Shoemaker's Last: It was the principle of "Shoemaker, stick to your last," and not domination by Du Pont, that kept General Motors from capitalizing on tetraethyl lead and other chemical discoveries, according to latest testimony in the government's long-lasting antitrust trial at Chicago. This was the tenor of an explanation by GM Chairman Alfred P. Sloan, Jr., of a provision in a 1930 contract setting up Kinetic Chemicals, Inc., owned 51% by Du Pont and 49% by GM. The clause spotlighted by government attorney E. Houghton Harsha said that GM's chemical developments would be turned over to Kinetic at prices to be agreed upon in each case. This clause later was cancelled as "unenforceable," Sloan testified. Scheduled as witness for this week: Charles F. Kettering, GM's famed inventor and research scientist.

•

Contempt Case: What happens if a company thumbs its nose at court orders supporting rulings of the Food & Drug Administration? An Oklahoma concern, charged with disobeying an injunction against shipping misbranded medicines in interstate traffic, was fined $500.

Feeble Atoms: FDA also is in this week's news because of its seizure of radioactive ore that was being sold at $2/lb. as a treatment for sickness. Leaflets accompanying the 5-lb. sacks of ore proclaimed: "Now! You may test the healing effects of the gamma rays of uranium ore in your own home." Since the ore contained less radioactivity than a luminous watch dial, FDA based its charges of "false and misleading curative claims," as the emission was too low to be a health hazard. Strongly radioactive material may not be sold without a prescription.

•

Leisurely Pace: After a speedy start, the Rohm & Haas lawsuit against Permutit Corp., over alleged patent infringement, has settled down to the leisurely pace that is more customary in patent litigation. Federal district court in Wilmington, Del., has approved a stipulation giving Permutit more time—up to April 15—to answer the complaint. Rohm & Haas charges that Permutit infringed patent No. 2,629,710, issued to Rohm & Haas on Feb. 24 and covering an intermediate base resin used in making anion exchange resins. When the suit was filed (*CW, Mar. 21*). it was erroneously reported that the patent had been issued to Permutit.

•

Face Tax Raps: Two chemical executives this week are facing trial on charges of federal income tax evasion. In Philadelphia, Louis Finkel, president of Lee Dye Works, is named in two indictments alleging evasion of $161,775 in personal taxes and $160,747 in corporation taxes. At Greensboro, N.C., a federal grand jury has indicted Lester W. Stevens, owner of High Point Chemical Mfg. Co., as having shorted the government of $124,823.

•

Taxation in Absentia: A court test has been proposed for a Pennsylvania law that seeks to impose a state corporation income tax on all companies that do business in the state, even if they have no place of business in Pennsylvania. State income tax blanks are being mailed to out-of-state firms that merely have nonresident salesmen soliciting orders that are accepted at the companies' home offices. The Drug, Chemical & Allied Trades Section of the New York Board of Trade feels that such a tax on strictly interstate business may be of questionable legality. If this tax law is upheld, DCAT warns, similar laws may be passed in other states.



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Charting Chemicals' Future

Over the next four years, chemical sales will climb by 21% and all industrial sales will rise by 10%, if company expectations are borne out.

During this same period, watch for capital-absorbing developments in coal hydrogenation, detergents, petrochemicals, vertical integration of chemical firms.

A 32% increase in production capacity and a 21% increase in sales—that's what leading chemical companies expect by 1956.

That the chemical process industries will continue to play a starring role in the nation's business expansion is proclaimed in the sixth annual McGraw-Hill survey of large business firms. Their replies indicate that chemical concerns' plans call for expansion and production boosts that are relatively twice as steep as the increases projected for all U.S. industries.

From the 1952 base, over-all industrial expansion is expected to amount to 7% this year and another 9% by 1956; corresponding figures for the chemical companies are 10% this year and an additional 22% by 1956.

Commerce Department data for all chemical companies (*CW Newsletter, Mar. 28*) indicate an 8% increase in plant and equipment investments this year. This would seem to show that large companies, as typified by those that participated in the McGraw-Hill survey, have more ambitious expansion plans both relatively and materially than those of their smaller contemporaries.

In cold cash, total capital expenditures planned for this year are up 6% to $23.3 billion; while for the large chemical companies surveyed, 1953 expansion is down 6½%—possibly indicating transition from defense to civilian production—to $1.36 billion.

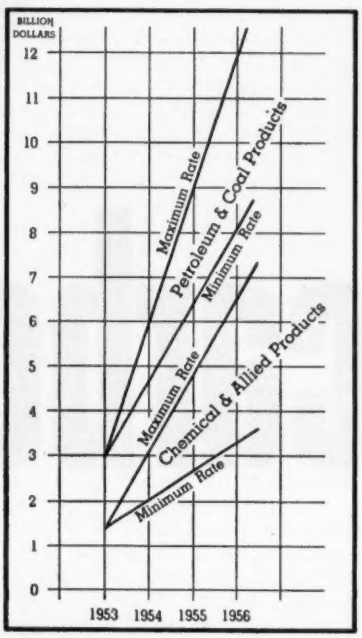
Increased Markets: One reason why industry plans new capacity is the feeling that there are larger markets ahead. The general tendency is to expect a 10% increase in total manufacturing sales and—showing no lack of self-confidence—a sales increase of 13% for individual firms. The chemical industry, by comparison, expects a 21% increase in its sales, and chemical executives expect their own company sales increments to surpass that figure by an average of 7%.

One method of capturing the bigger markets will be new products and processes, say businessmen in their replies. Through new processes, efficiency will be increased and production costs will be lowered. When asked what new products or processes would require the greatest capital outlay, chemical companies answered that coal hydrogenation could reach the stage where it would necessitate large capital investment. Also expected: more synthetic detergent plants, more plants for petrochemical derivatives, and vertical integration of chemical companies.

Trend Toward Modernization?: Most companies report a shift in financing, with a greater percentage of total capital spending going toward modernization, rather than expansion. As indicated by the figures, the industries expecting the largest portion of their funds to go toward moderniza-

Depression Won't Stop It

(Planned capital spending under various business conditions—cumulative, 1953-1956)





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	% Myristyl Alcohol	% Cetyl Alcohol	% Stearyl Alcohol	% Oleyl Alcohol	% Linoleyl Alcohol	Iodine No.	Saponification Value	Titer
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MAKANOL II	6	27	67	..	..	4	2	52

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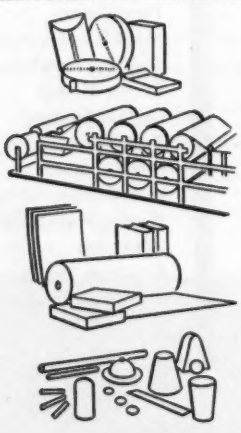
LEMOL 51-98 — High viscosity, completely hydrolyzed . . . Waterproof adhesives . . . For compounding with polyvinyl acetate emulsions . . . Thickening agent . . . Laminating adhesives . . . Saturant high strength paper . . . Wet strength paper . . . Grease resistant paper coatings . . . Unsupported film . . . Gasoline, oil and grease proof gaskets . . . Warp and fill size for cotton and viscose yarn.

LEMOL 24-98 — Medium viscosity, completely hydrolyzed . . . Applications similar to 51-98 grade . . . Particularly recommended for unsupported film . . . Grease proof barrier . . . Solvent resistant gasket stock . . . Temporary protective coatings . . . Binder for pigmented paper coatings . . . Surface sizing of paper . . . Pigment binder in paper coatings.

LEMOL 5-98 — Low viscosity, completely hydrolyzed . . . Applications similar to 51-98 and 24-98 grades. Low viscosity permits higher working concentrations . . . Clay binder in ceramics.

LEMOL 42-88 — High viscosity, partially hydrolyzed . . . Protective colloid . . . Emulsifying agent . . . Thickening agent . . . Extender for polyvinyl acetate emulsions . . . Remoistenable adhesives . . . Warp size for viscose and cotton yarns . . . Water soluble unsupported film.

LEMOL 22-88 — Medium viscosity, partially hydrolyzed . . . Permits higher working concentrations than 42-88 type . . . Protective colloid . . . Emulsifying agent . . . Thickening agent . . . Extender for polyvinyl acetate emulsions . . . Remoistenable adhesives . . . Warp size for acetate and nylon yarn . . . Water soluble unsupported film . . . Temporary protective coatings.



LEMOL 5-88 — Low viscosity, partially hydrolyzed . . . Most water sensitive grade . . . Emulsifying agent . . . Remoistenable adhesives . . . Warp size for acetate and nylon yarns . . . Least sensitive to added salts . . . Temporary protective coatings . . . Temporary ceramic binder.

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tion and replacement are the ones in which total spending is declining. In the chemical industry, there is only a slight trend toward modernization, with the greater portion of depreciation funds allocated to expansion—71% this year, 67% for 1954-'56.

Even if business conditions deteriorate, it was reported, investments in new plants and equipment would not be cut by more than one-third. Preliminary plans call for an expenditure of about $9.3 billion a year in the period 1953-'56. If a business recession occurs, expenditures would recede to only about $6 billion.

If, on the other hand, businessmen are able to take full advantage of technological developments, they expect maximum capital expenditure to amount to about $13.8 billion. The chemical industry, if the economic seas are smooth and rock-free, stands ready to spend up to $1.76 billion a year for expansion between 1954 and 1956.

Key Firms Covered: More than 60% of all workers in industries where capital investment is highest are employed by the companies that cooperated in the McGraw-Hill survey. These industries, including the chemical industry, account for two-thirds of all spending for capital goods. About one-quarter of the total employment of all industry was represented in the survey.

Their replies spell out a forecast that indicates clear economic weather ahead for the next four years. And even if a slump or recession blows up, these large companies still intend to keep on building for the recovery they expect will follow. And their faith in this future will be backed by more than $81 billion in capital spending.

KEY CHANGES . . .

P. T. Sinclair and Edward P. Stamm: To vice-presidents, Crown Zellerbach Corp., Portland, Ore.

James R. O'Connor: To president, Unexcelled Chemical Corp., New York, N.Y.

P. H. Delacour: To vice-president, sales, Cabot Carbon of Canada, a subsidiary of Godfrey L. Cabot, Inc., Boston, Mass.

H. W. Barber, Jr.: To general manager, Drug Specialties, Inc., Winston-Salem, N.C.

Keith Horner: To executive vice-president, Ciba Co., Inc., New York, N.Y.

William H. Kieffer: To general sales manager, Ciba Co., Inc., New York, N.Y.



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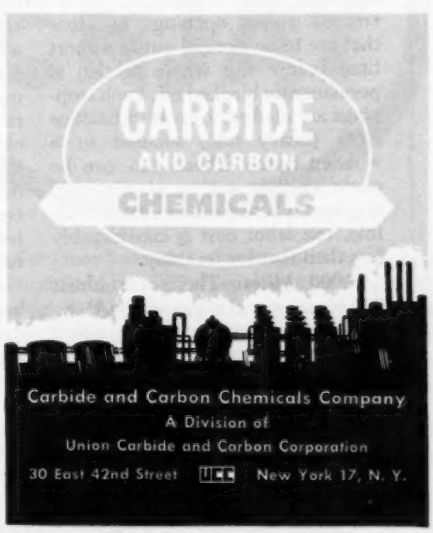
acetaldehyde
butyraldehyde
paraldehyde
crotonaldehyde
acetaldol

These highly reactive materials are important as chemical intermediates. Antioxidants, rubber accelerators, and dyes are made from acetaldehyde, paraldehyde, and crotonaldehyde. Butyraldehyde and acetaldol are also intermediates for rubber accelerators. Synthetic resins are prepared from acetaldehyde, paraldehyde, and butyraldehyde. Acetaldol is an additive in electroplating solutions, an inhibitor in the pickling of steel, and is an approved denaturant. Polyvinyl butyral—made from butyraldehyde and polyvinyl alcohol—is an interlayer for safety glass and is also used in coating applications.

Synthetic resins—for treating paper, shrinkproofing rayon, and making plastics—are prepared from aldehydes. These chemicals are also used in embalming fluids, in the insolubilization of protein and dextrin glues, and in flavors. Here are eleven other Carbide aldehydes that may improve your products or processes:

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target

Tight Tunnels In Mines

A coal mine is hardly the kind of place a chemical manufacturer thinks of as a market for his products. But the coal industry, like any other field, hasn't solved all its production problems yet. And the answers to some of them may be found in chemicals.

Two of these: sealing "stoppings" to prevent loss of air pumped into the mine; coating tunnel roofs to prevent spalling and rock falls.

Stoppings are the partitions constructed in mines to close off openings made to keep fresh air circulating to the working face. As new openings are made at 50-100 ft. intervals, old ones are closed to channel the air current forward. The more air-tight the stoppings, the less the by-passed air.

Plugging the Holes: Permanent stoppings—those sealing off fairly long panels and designed to last 10-15 years or more—are constructed of concrete or cinder block, or the like, and mortar. Such masonry construction however, is generally pervious to air under pressure. That's where chemical products come in.

Both vinyl and asphaltic compounds sprayed under pressure cut these air losses and reduce the power requirements for mine ventilation systems. In one test, for example, sealing stoppings with an adhesive binder and vinyl "cocoon" cut the loss of air being supplied to the last crosscut in the mine almost 50%, effected a power saving calculated at $3,500/year for one fan.

The same materials can be used for temporary stoppings — those erected across openings in areas that are to be worked out in a short time before the whole section is permanently blocked off. Such stoppings are made of canvas or brattice cloth (heavy jute) secured to a wooden frame. These, too, can be made air-tight with a plastic coating, and where such types are feasible, the labor cost is considerably less than that for masonry.

9,000 Miles: There are about 3,000 major coal mines in the U. S., and the average mine has about three miles of entry requiring permanent stoppings. With some 100 stoppings every mile, the total is probably 1-1¼ million stoppings in place today. Assuming that an average one (6½x16 ft.) would require 2 gals. of material, there is a market for some 2.5 million gals., for which mine operators might pay as high as $5/gal., depending upon the individual operation. Added to the existing stoppings are the 60,000-75,000 new permanent stoppings required each year.

And there are many more temporary than permanent stoppings set up. A normal mine has 4-6 panels 1,500 ft. long in operation at one time; these are worked out in about three months. With 20 stoppings required for each panel, that means some 400 temporary stoppings per mine per year, or an annual total of 1,200,000 for the country's 3,000 big ones.



MINE SPRAY: Keeping air out keeps roofs up.

Although stoppings may be the big target for formulators of suitable products, the many miles of roof is another sizable market for a similar kind of material. Here the problem is to keep air and moisture out of contact with the roof since moist air, because of temperature changes or chemical reaction with the coal or both, causes spalling and rock falls in haulageways and aircourses. Whether "roof painting" is feasible, however, depends on the nature of the coal deposit.

Coating one mine roof—after it had been scaled and freed of dust during the dry period—with an asphalt-base material, for example, gave satisfactory control of roof deterioration. And the mine operator reports that the cost of such applications is but 1% of that previously needed to keep passages clear of fallen rock and properly shored.

Big Obstacle: Many chemical makers, naturally, have been aware of this fairly obscure market, and some were making fair headway in developing it until last year. Then one of the compounds was the source of a fire in a Pennsylvania coal mine, and that state's Secretary of Mines prohibited their use.

Other states do not require approval for use, but since Pennsylvania is a leader, and since mine operators fear fire as much as any hazard, sale of such products has been slowed somewhat. That state, however, now has four revamped formulations under consideration, and may approve some within a week or so. And one maker, Joseph Woodwell Co. (Pittsburgh) reports that its material Ruflok, has already received the state's o.k.

Those who do get permission to sell in Pennsylvania will have to prove that their material is nonflammable and nontoxic. To satisfy this requirement the trend in formulation seems to be away from solvent carriers to water dispersions. Among types in the works are asphaltics, vinyls, acrylates, and one composed of clay and a binder.

But even if producers meet the stiffer requirements, they must convince operators that coatings can replace shoring with timber and steel or reinforced concrete. And the low percentage of stoppings being treated today (1%) is evidence of developmental work still to be done there, too.

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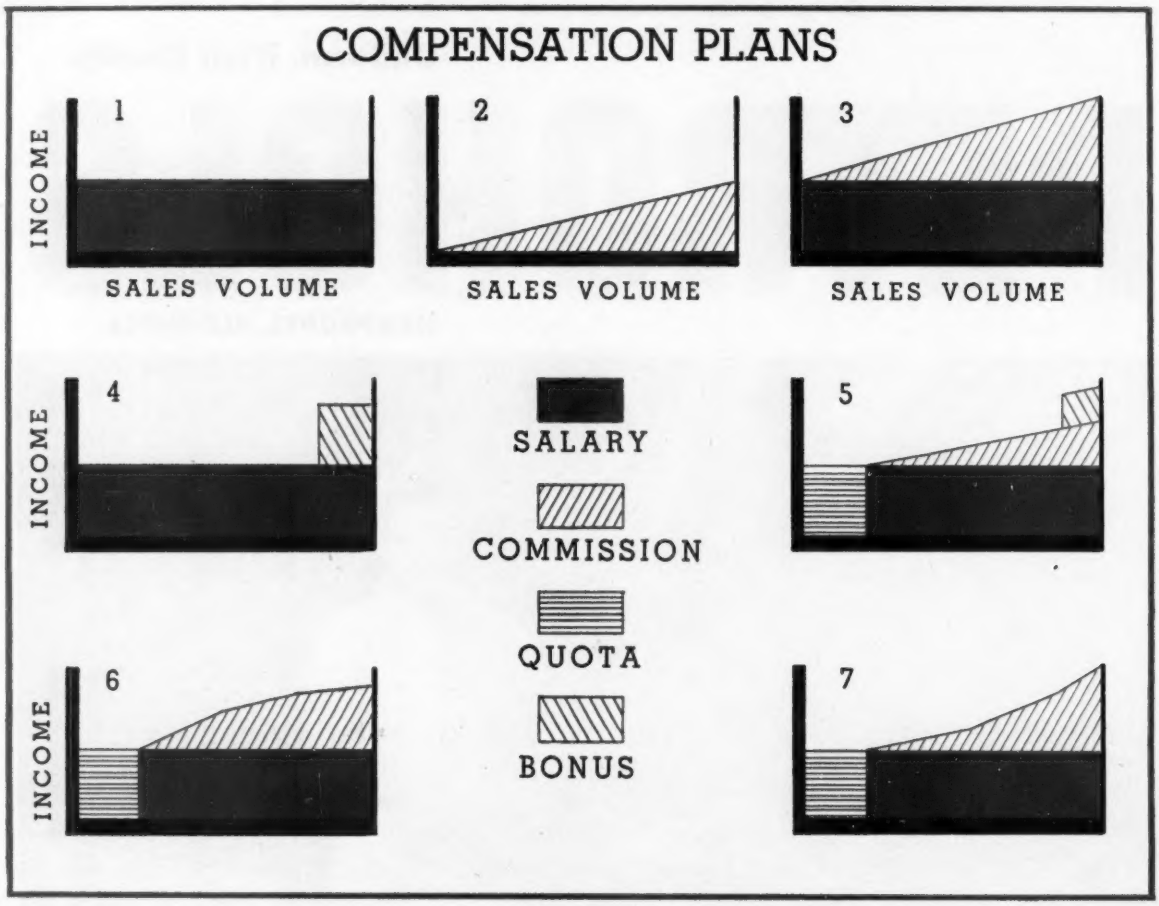
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PARADYNE	Secondary Butyl Acetate	Decyl Alcohol
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Ethyl Ether	Isopropyl Ether	Ethyl Ether
Isopropyl Ether	Dicyclopentadiene	Isopropyl Ether
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Chemical Salesman—How Should He Be Paid?

The average chemical salesman paid his taxes last month on a 1952 income of $8,400. And the chances are this figure was somewhat higher than the base salary entered opposite his name in his company's records. The difference came to him in the form of commissions, bonus, or some combination thereof.

But this average salesman is merely a mathematical calculation. His real-life, order-taking counterparts earn anywhere from $3,500 to $35,000 a year. And they get that pay in a bewildering number of different ways (*see chart above*). Each of these pay plans is being used today in some part of the chemical industry. Yet each of them is a specific company's answer to the single question: What is the best way to pay a chemical salesman?

To search out the industry's answers to this problem, CHEMICAL WEEK asked Pfaudler Co.'s Larry Avery* to interview chemical sales managers in widely scattered parts of the country. Representing both large companies and small, the managers control an aggregate sales force numbering upwards of a thousand salesmen.

Now completed, Avery's report indicates that the method of paying salesmen is a top-drawer worry for nearly every sales executive. Over 40% of them have overhauled their own plans in the last five years. At least one in five is planning to make adjustments within the near future. It's all a part—and a vital part—of today's sharpening of sales tools for the tougher-selling times descending on the industry. The objective is to make the salesman's pay not only a compensation for services received, but also an incentive for even stronger selling in the months to come.

Inner Drive: It is these psychological overtones that make paying a salesman a difficult task. There is no easy way to evaluate the morale-building effectiveness of any given plan. When the salesman is making his pitch at the point-of-sale, it is a solo performance. No supervisor is watching over his shoulder, nor can the purchasing agent be asked to fill out a questionnaire stating whether or not he's been "sold."

Further, under the conditions of chemical selling, the dollars-and-cents yardstick of orders received applies not only to requisitions mailed the same day, but equally to those initiated years later, after the cus-

* An experienced equipment salesman, Avery is in daily contact with the chemical industry. His general interest in salesmen's compensation stems from work on his master's thesis.

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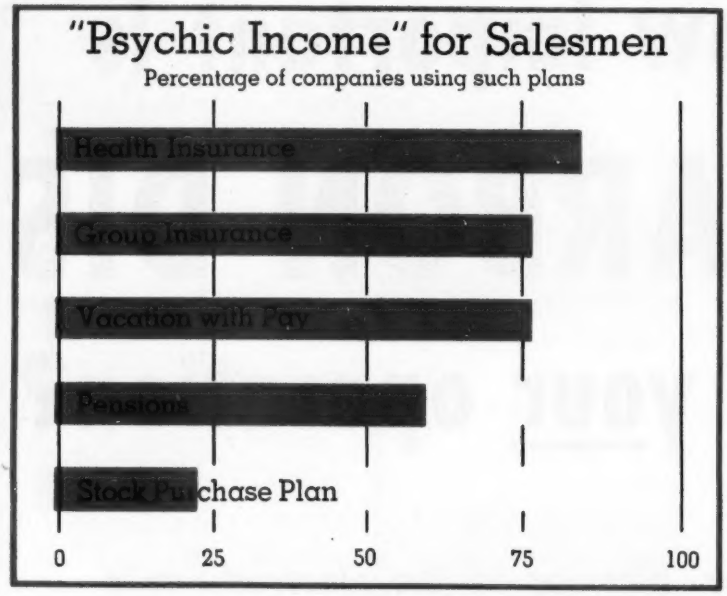
BORASCU*®
BORASCU-44*®
CONCENTRATED BORASCU*®
POLYBOR*®
POLYBOR-CHLORATE®
POLYBOR-CHLORATE 88®

*Sodium Borate Concentrates which offer economical sources of Sodium Borate for special applications.

INFORMATION, SAMPLES AND BULLETINS SENT PROMPTLY ON REQUEST

PACIFIC COAST BORAX CO.
DIVISION OF BORAX CONSOLIDATED, LIMITED
NEW YORK • CHICAGO
LOS ANGELES • CLEVELAND
PHILADELPHIA

MANUFACTURERS OF FAMOUS 20 MULE TEAM PACKAGE PRODUCTS



tomer has completed his research program.

The problem of the chemical sales executive is, therefore, to develop a compensation program that will give his men the drive of an alert, aggressive sales force—and will, at the same time, be economically consistent with the stable repeat-order character of most chemical sales.

In resolving these two contradictory aims, the sales manager must take his position between two extreme types of pay plans. The first of these is the straight-salary method. It essentially recognizes little relationship between a salesman's value and his short-term sales volume. It is significant that, according to Avery's survey, over half of the companies interviewed use this plan. It is also significant that most of the chemical managers who are planning changes are looking for more incentive than their present straight-salary programs allow.

The other extreme—that of complete incentive—is the straight-commission type. Here the salesman earns in direct proportion to his order-writing performance. Only 5% of the chemical industry uses this plan.

The trend revealed by Avery's report is away from both of these extremes. The result is a composite of salary and commissions that can take many forms. If the movement is away from straight salary, the variable commission (or graduated annual bonus) amounts to only 25% of the new total income.

If the plan, however, had formerly been of the straight-commission type, this variable portion of the earnings remains predominant (50-70% of the total). In this case, the salary is often camouflaged as a "guaranteed drawing account against commissions."

In both cases, the objective is to give the sales force a measure of security—plus a personalized drive to hold or increase sales.

Greener Pastures? One facet of

The Range—By Company Size

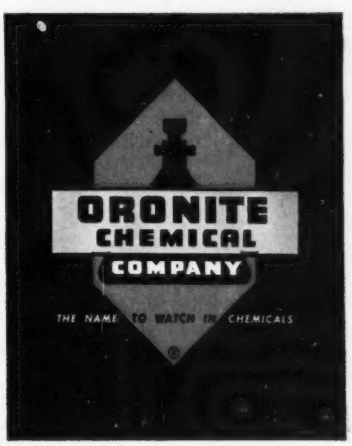
Size of Company	Highest Paid Salesman	Average Salesman	Lowest Paid Salesman
Sales under $10 million/year	$15,000	$9,200	$5,350
Sales of $10-25 million/year	13,300	6,940	4,850
Sales over $25 million/year	13,070	8,228	4,757

INQUIRE ABOUT

Oronite POLYBUTENES

a versatile chemical widely used to improve products and performance at reduced raw material costs

Properties: Polybutenes are nearly water-white chemically inert liquids of moderate to high viscosity and tackiness. They have excellent aging characteristics—do not become gummy or waxy and do not harden, darken or change in any essential property over long periods of atmospheric exposure. Polybutenes can be readily emulsified using standard techniques and equipment. They are available in four grades, based on viscosity. Complete information is available in a technical bulletin sent on request.

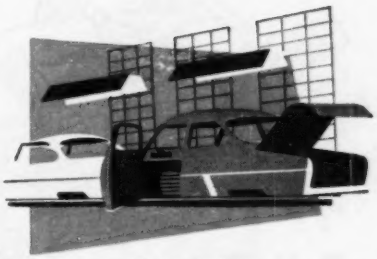


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A partial list of Oronite Products

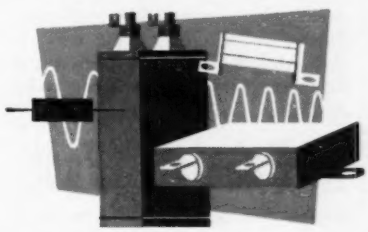
Detergent Alkane
Detergent Slurry
Detergent D-40
Detergent D-60
Dispersant NI-O
Dispersant NI-W
Wetting Agents
Lubricating Oil Additives
Cresylic Acids
Gas Odorants
Sodium Sulfonates
Purified Sulfonate
Polybutenes
Naphthenic Acids
Phthalic Anhydride
Ortho-Xylene
Xylol
Aliphatic Acid
Hydroformer Catalyst
Dispersant FO
(Domestic Fuel Oil Inhibitor)

ORONITE CHEMICAL COMPANY
38 SANSOME STREET, SAN FRANCISCO 4, CALIFORNIA
30 ROCKEFELLER PLAZA, NEW YORK 20, NEW YORK
STANDARD OIL BLDG., LOS ANGELES 15, CALIFORNIA
600 S. MICHIGAN AVENUE, CHICAGO 5, ILLINOIS
MERCANTILE SECURITIES BUILDING, DALLAS 1, TEXAS



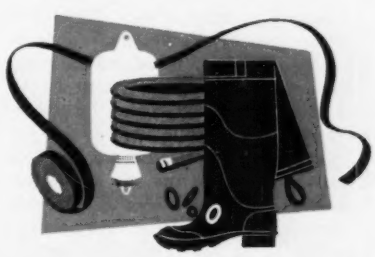
Ideal for sound deadening, insulation or calking compounds

Polybutenes are widely used in various insulating compounds by the automotive industry (1) to prevent rust and corrosion of metal chassis parts (2) to prevent rattles and squeaks as a "noise eliminator" between metal to metal surfaces. In the home appliance industry as an insulation compound medium against heat or cold. Compounds can be pigmented or used in natural color of the mineral filler.



Electrical properties outstanding

Oronite Polybutenes offer superior dielectric strength, low expansion coefficient and low power factors essential in paper-insulated electrical products. Because of their low power factor values over a wide frequency range, they are useful as a dielectric in condensers and capacitors. Accelerated aging tests show the great stability of this power factor over long periods of time. Their compatibility with many synthetic rubber and rubber-like polymers permits ready compounding for flexible insulations.



Economical extender of rubber

Polybutenes can be used as a rubber extender in the manufacture of rubber boots, garden hose, hot water bottles and a host of other molded rubber products. Besides extending rubber, Polybutenes plasticize the mass of rubber making it more pliable for easy milling. Polybutenes are also used in milling up reclaimed rubber batches and have a field of usefulness in plasticizing various synthetic rubber latices.

DOW CORNING SILICONE NEWS
NEW FRONTIER EDITION
TWELFTH OF A SERIES



Tall Tale

Take Paul Bunyan now, he was born to do big things. Outgrew his first cradle in a week, and his second an' third before they was even finished. Finally put him in a twenty-foot trough his old man built overnight and anchored off Kittery Point. But Paul got restless out there and rocked so hard he made a tidal wave that swamped towns from Bath to Bangor. Hearin' folks talking about what to do with him, Paul wades ashore and disappears into the tall timber, wearing his cradle like a cap.

to Fabulous Fact

Same's true of silicones. Ever since they were born in a laboratory at Corning Glass Works, silicones have outgrown their kettles and stills faster than Dow Corning could build them. And we've built them fast. Productive capacity was doubled, redoubled and doubled again in the first eight years. Now in our eleventh year, we're building new plants faster than ever because engineers have learned that silicones were born to do "impossible" things.

They are, for example, fluids and resins that keep clothes, shoes and masonry walls dry in the rain; release agents that keep bread, rubber tires, and crankshafts from sticking in the molds. They're electrical insulating materials that double the power per pound ratio in electric machines or multiply by ten the life of electric motors. They're rubber that won't melt in jet engine deicer flaps or crack when bomb bay doors close at 100 below zero.

They're problem solving materials described in our basic publication "What's A Silicone?" Please write Dept. BR-4 for your copy.

DOW CORNING CORPORATION
Midland, Michigan

ATLANTA • CHICAGO • CLEVELAND • DALLAS
NEW YORK • LOS ANGELES • WASHINGTON, D.C.
In England: Midland, Silicones Ltd., London • In Canada: Fiberglas Canada Ltd., Toronto

DOW CORNING SILICONES

DISTRIBUTION. . . . .

Avery's report confirms a suspicion long held by big-company salesmen: that they could do better working for a smaller company (*see table, page 30*). But in accordance with the greener-pastures adage, earnings figures do not give the whole story.

For Avery also learned that small companies favor straight-commission and salary-commission plans, and during these good years, this has resulted in unusually high pay to sales forces.

This predominance of commission arrangements is understandable. Small companies are necessarily interested in immediate sales volume. They need aggressive, "hungry" salesmen to keep the orders pouring in.



SALESMAN AVERY: "Money is the best incentive."

Long-term growth is naturally desirable, but the first consideration is to keep the company alive. One big order can make all the difference.

But for the commission salesman, there are real risks. In lean years, his income may dwindle sharply. He operates with a minimum of such promotional aids as advertising and technical service. The difference in cash earnings may (depending upon the individual) be more than compensated for by the "psychic income" of larger-firm prestige, paid vacations, group insurance, pension plans, and the like.

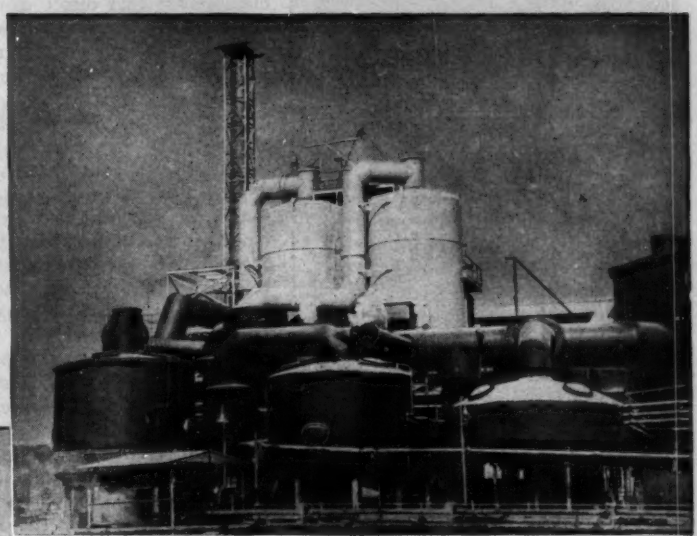
Indeed, proponents of the straight-salary type of compensation claim that it has distinct incentive features of its own. They might be called "career incentives" in contrast with monetary goals. The beginning salesman is at the bottom of a many-runged ladder leading up to the top of the company's sales department, and he is assured of a financial reward for each

How much sulfuric acid do you need?

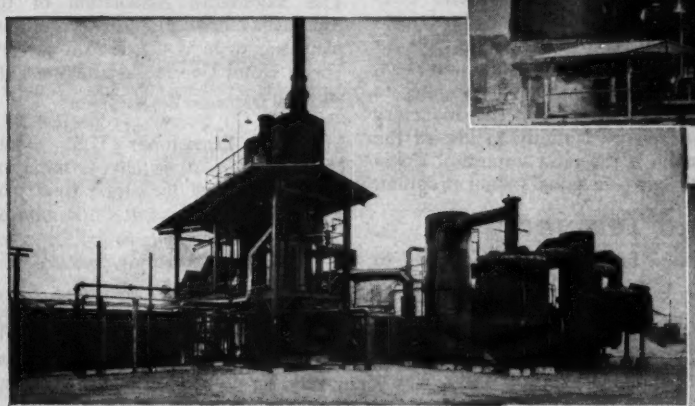


Among the many Chemico-built contact sulfuric acid plants in service today all over the world, one has a capacity of only five tons per day. Another produces more than five hundred tons per day. Others range in between.

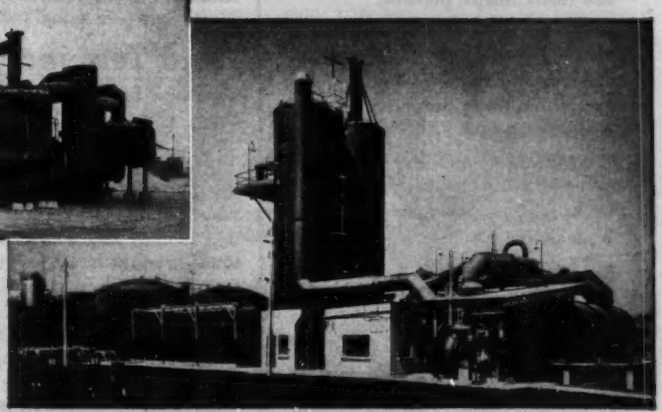
Whatever your sulfuric acid requirements are, Chemico will design and furnish you with a highly efficient plant exactly suited to your needs . . . on a one-contract, guaranteed-performance basis.



500 Tons



50 Tons



200 Tons

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A UNIT OF AMERICAN CYANAMID COMPANY

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Chemico plants are profitable investments

CC-249



D&O Industrial Odorants can paint your sales picture in bright new colors. **Soaps, plastics, waxes, synthetic detergents, paints, polishes, petroleum derivatives, rubber, glue, insecticides, moth specialties, room deodorants** and **cleaning fluids**—all take on shining new sales appeal, at little added cost, with D&O Industrial Odorants. Let us solve your odor problem. Write today for catalog, samples and specific information.

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PERFUME BASES • VANILLA • FLAVOR BASES

climbing step. He sells hard in order to become a district manager, whereas the commission salesman rarely identifies himself with the company structure to that extent

This lack of identification has been the chief reason for the reluctance of chemical companies to adopt a commission plan. One company, which discovered that its percentage salesmen refused to keep themselves technically up to date, found it necessary to revert all the way back to a straight-salary program. At that particular point in its development, the company needed career men who were willing to build for the future.

Extra Push: But as the chemical industry matures and competitive lines are more closely drawn, the chances are that direct monetary incentives will become increasingly important. As one sales manager candidly told Avery: "Money is the best incentive we know."

But for many companies, the change will not come easily. Sales executives will find themselves wrestling with unknowns. Quotas, commission rates, special bookkeeping arrangements, division of territories and accounts—all of these must be developed with the least upset to the personalities and ambitions of the very human salesmen.

Companies now in the process of this adjustment find it is best to keep the situation fluid. Salesmen's complaints must be listened to fairly—and acted on promptly. This calls for calm executive leadership. In fact, many sales managers are coming to realize that—whatever the monetary plan—their own ability to inspire the salesmen is the most important single ingredient of a good selling program.

Ohio Terminals

Two new terminals are now added to those that make the Ohio River a major chemical artery.

At Industry, Pa., near Pittsburgh, Shell Chemical Corp. has opened its new 2½-million-gal. tank farm, which will handle acetone, alcohols and ketones brought in by barge from Houston, Tex. The terminal will be operated by Great Lakes Solvents, Inc.

And at Louisville, Ky., American Barge Line Co. is rushing to completion what it calls "the largest and most modern river terminal on inland waterways." Operated by Port of Louisville, Inc., a wholly-owned subsidiary, the terminal will have a 130,000-sq. ft. warehouse.

•

World Trade: The U.S. Chamber of Commerce has designated the week of May 17-23 annual World Trade Week to coincide with National Maritime Day on May 22.

•

Best Bets: Dodge & Olcott's new president, John Cassullo, has just come back from an extensive trip to the south with the report that three countries—Colombia, Peru and Venezuela—are the best Latin American market potentials for U. S. chemical exports. In Cassullo's opinion, these nations are on the verge of achieving modern industrial growth—more so than any of the other countries in the South American community.

•

For LP Salesmen: After a year of effort, the National Committee for LP-Gas Promotion (Chicago) has come out with a set of eight booklets on LP salesmanship. Intended as a complete sales training course, the set includes examination and answer sheets—plus a leader's guide for the teacher.

•

For LP Shippers: In another bit of LP-gas news, the Defense Transportation Administration has calculated that nearly one third (2,012) of all the railroad tank cars built in 1952 were designed for LP-gas service.

•

Sales Clinic: Sumner Chemical's Ralph Ericsson will be in command again this year at the second annual Chemical Sales Clinic conducted by The Salesman's Association of the American Chemical Industry. Present plans are to hold the session at New York's Hotel Commodore October 19 and 20.

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Michigan Limestone: U.S. Steel's Michigan Limestone Div. is initiating work on a new limestone quarrying and processing plant at Cedarville on Michigan's upper peninsula. Expected capacity: 3 million tons/year.

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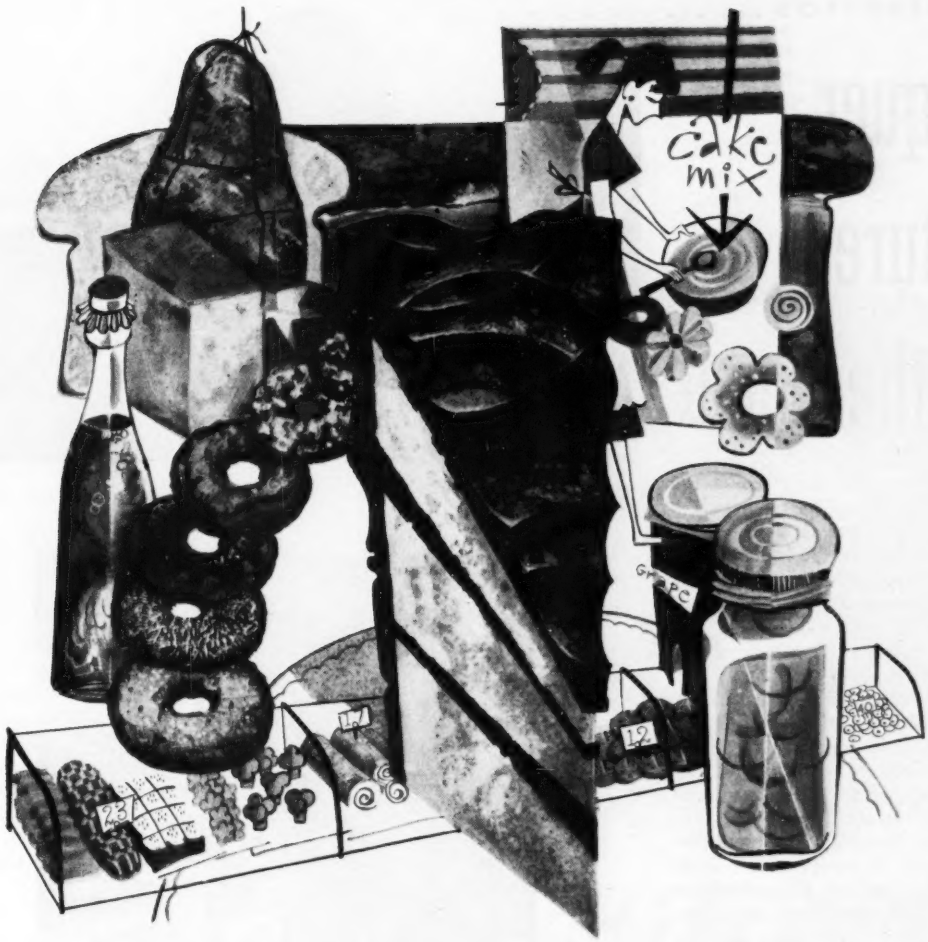
Safe Silage: Monsanto has completed its field tests, is now promoting heavily the use of 22x30-ft. vinyl sheets as covers for outdoor storage of silage crops.

•

PVI: General Aniline & Film is now able to ship drum lots of polyvinyl isobutyl ether in any one of three molecular-weight grades ranging from a tacky semisolid to an amorphous white powder.

•

For Petroleum: The American Society for Testing Materials has published, in cooperation with Britain's Institute of Petroleum, a new handbook, the "ASTM-IP Petroleum Measurement Tables."



Monsanto Phosphates for Finer Foods

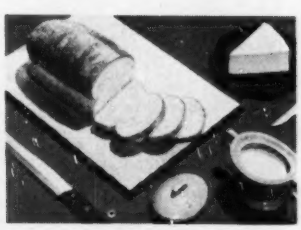
Food looks better . . . tastes better . . . sells better, when Monsanto phosphates are put to work.

Monsanto sodium acid pyrophosphate, for example, is an outstanding leavening agent which lengthens shelf life, improves grain and volume of cakes made with prepared mixes. Other phosphates made by Monsanto—the world's largest producer of elemental phosphorus—put the smoothness in processed cheeses, clarify sugar, furnish important dietary supplements and aid in growing yeast.

To find out more on how Monsanto Phosphates can help *your* business, write today to MONSANTO CHEMICAL COMPANY, Phosphate Division, 1700 South Second Street, St. Louis 4, Missouri.



BAKING'S MADE EASY when the housewife uses self-rising mixes containing Monsanto phosphates to improve cake grain and volume.



FROM SUGAR TO CHEESE, from yeast to biscuits, Monsanto phosphates help in the production and processing of countless important foodstuffs.



FOOD MYSTERIES SOLVED HERE . . . in this fully staffed laboratory Monsanto food technologists investigate all important phases of phosphates in foods.

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Lacquer Lectures On the Road



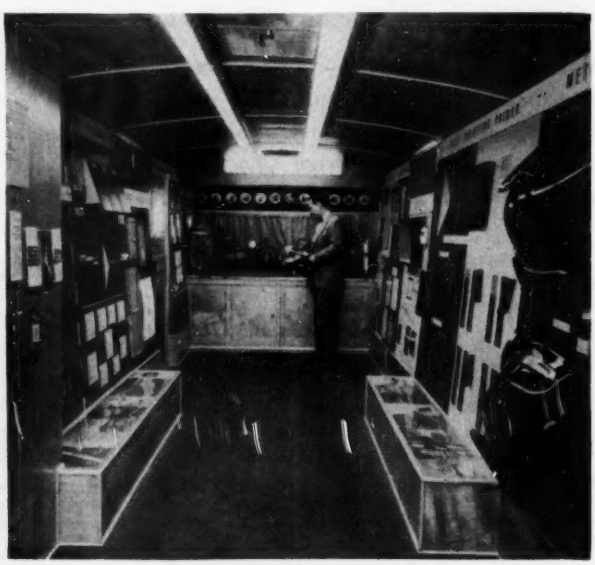
AN IDEA born two years ago at the annual "Paint Show" is now on the road. Hercules Powder's Lacquer Information Center turned out to be such an effective selling gimmick that the company moved it into a 35-foot trailer and will send it out this week on a year-long tour of the U.S., Canada and Mexico.

The ambitious aim: to drive in the front gate of every one of Hercules' 500 lacquer customers. Two men from Wilmington will travel with the trailer —to be joined by the local sales force in each territory.

The trailer, thoroughly lacquered inside and out, is equipped for both instruction and selling. It has facilities for showing motion pictures, and demonstration spray equipment can be detached for actual use in customers' plants. What's more (*see below*), the designer thoughtfully provided a handy conference desk for order-writing Hercules salesmen.









"I could see the corpsman kneeling over me. The blood plasma was running down through a tube into my arm and he said everything was going to be O.K. I was walking across an enemy mine field in Seoul when one exploded and a piece of shrapnel caught me in the leg.

" 'Got enough of that stuff?' I asked him, pointing to the blood. 'I guess we never have enough,' he said, 'but you can thank *somebody* for this pint.'

"How do you thank 'somebody' for blood? For saving your life? When I got back home, I discovered the answer at my local blood donor center. There's only *one* way to say thanks—by giving some of your own blood."

"How do you thank 'somebody' for Blood?"

Yes, all kinds of people give blood—for all kinds of reasons. But whatever *your* reason for giving blood, this you can be sure of: Whether your blood goes to a combat area, a local hospital, or for Civil Defense needs—this priceless, painless gift will some day save an American life!

Business Executives!
√Check These Questions!

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ☐ Have you given your employees time off to make blood donations?
- ☐ Do you have a Blood Donor Honor Roll in your company?
- ☐ Have you set up a list of volunteers so that efficient plans can be made for scheduling donors?
- ☐ Have you arranged to have a Bloodmobile make regular visits?
- ☐ Has your management endorsed the local Blood Donor Program?
- ☐ Have you informed employees of your company's plan of co-operation?
- ☐ Was this information given through Plant Bulletin or House Magazine?
- ☐ Has your company given any recognition to donors?
- ☐ Have you conducted a Donor Pledge Campaign in your company?

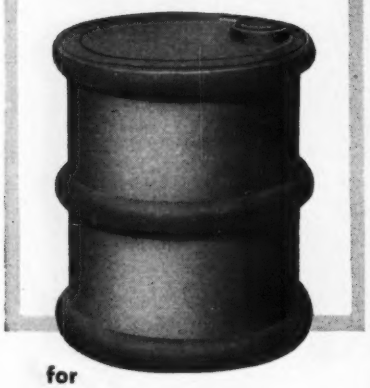
Remember, as long as a *single* pint of blood may mean the difference between life and death for *any* American . . . the need for blood is *urgent!*

Give Blood Now—Call Your Red Cross Today!

National Blood Program

ALL RUBBER DRUM

SAFE AND EASY TO HANDLE!
NO METAL
NO BREAKAGE



for

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- **FERRIC CHLORIDE**
- **CORROSIVE LIQUIDS**

★

ICC-43A SPEC.
Tare Weight—34 lbs.
13 gallon capacity

★

Made with
Natural, Neoprene,
Butyl or other Synthetic
Rubber Linings

★

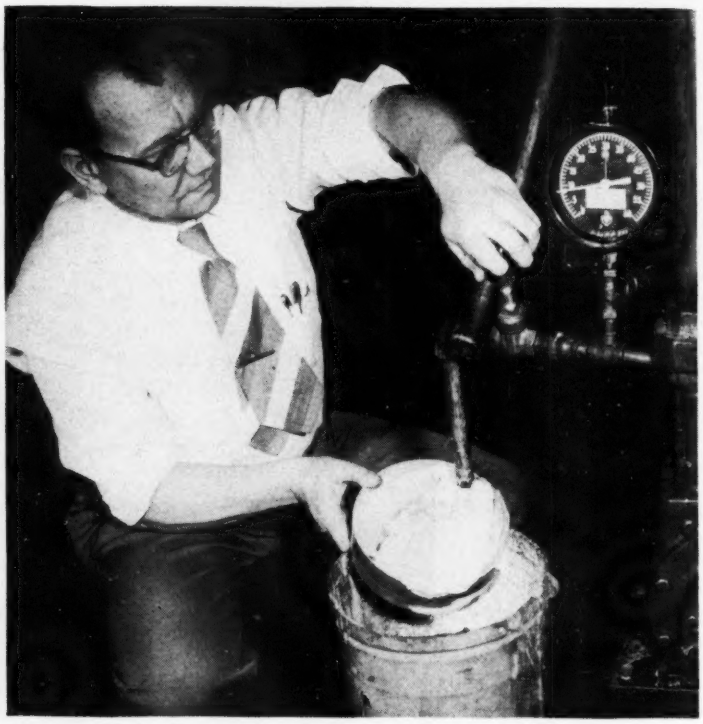
Threaded or Stopper type closures

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RESEARCH . . .



SLIDING VANE PUMP generates foam for Syracuse studies. Project leader Cornelius Grove takes a sample in order to measure liquid drainage rate.

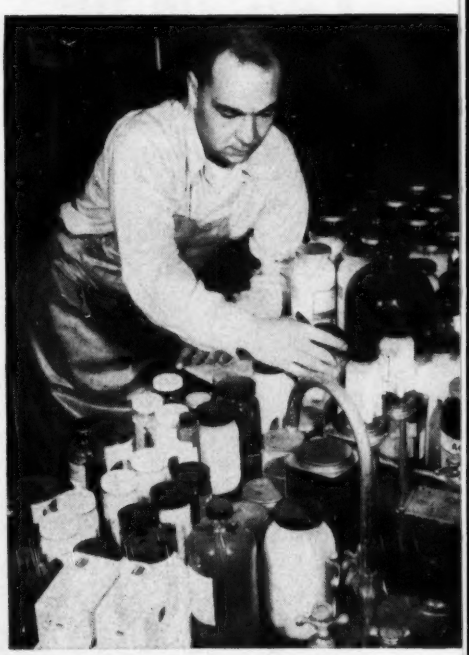
Navy Probes Foam

CONTINUING studies of fire-fighting foams are paying off. More important than preventing property loss are accrued savings in human lives. The U.S. Navy is among those showing the keenest interest, offering the largest research subsidies.

Always a terror-filled nightmare to seafaring men, fire at sea proved a more-than-adequate impetus for such studies many years ago. But World War II and, more recently, launching and landing fast-flying jets on aircraft carriers supplied stimulus anew for maintaining research grants.

While the more spectacular testing of foams in actually fighting fires is done by the armed forces themselves, much of the basic research and development is farmed out to non-government organizations. This week, CW CAMERA visited Syracuse Univ., where foam studies have been in progress since 1948.

Cooling Comes First: Two years ago (*CW, June 2, '51*), scientists at the Naval Research Laboratory (Anacostia, Md.,) validated a long suspect-



DETERGENTS are collected by investigator Walker, later checked for fire-fighting potential.

BEHIND *tougher, smoother glass & ceramics*



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THREE ELEPHANT* PRODUCTS

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Boric Acid, Technical and U.S.P.
Pentahydrate Borax (refined)
PYROBOR* Dehydrated Borax

TRONA† BRAND	ESTON BRAND
Lithium Chemicals	Aerosols
Muriate of Potash (chemical and agricultural grades)	Defoliants
Sulphate of Potash	Fumigants
Salt Cake	Herbicides
Desiccated Sodium Sulphate	Insecticides
Soda Ash	Organic Bromides
Sodium Pentaborate	Refrigerants
	Sulphur Dioxide

*Trade Mark Registered
†Trade Mark American Potash & Chemical Corp.

TRONA
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ESTON CHEMICALS

BORAX with its fluxing ability, antiseptic properties and alkaline nature, finds innumerable uses from the glaze on dinnerware to the vitreous enamel on refrigerators, stoves and kitchen ware. It plays an important part in the production of heat resistant glassware where tough and durable qualities are essential.

For years BORAX has been employed extensively in the preparation of soap and cleaning compounds, but its applications go even further—into the field of metallurgical processes, the textile and cosmetic industries.

BORAX is one of the *basic* chemicals produced by American Potash and Chemical Corp. In its various raw and processed forms, it is available under the trade name "THREE ELEPHANT BRAND." Today, the trade recognizes that from American Potash & Chemical Corp. they may purchase Borax and Borax derivatives of the highest quality suited for every manufacturing requirement. If you use BORAX in any of its various forms, check your requirements with American Potash and Chemical Corporation.

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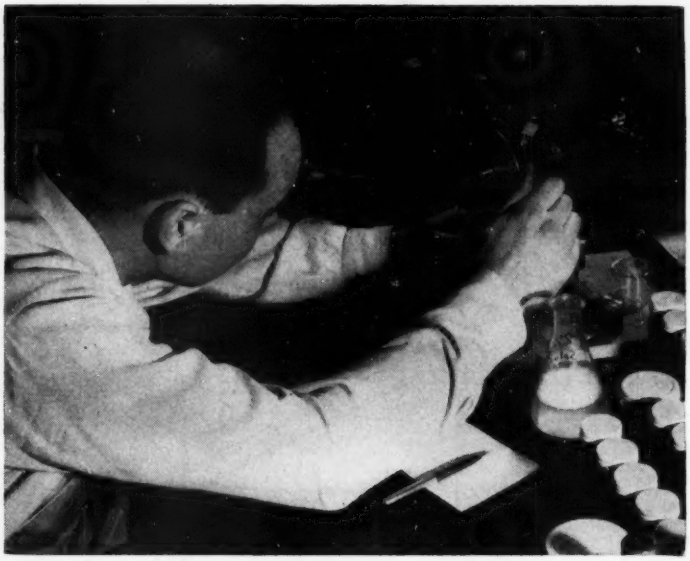
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HIGH FOAMABILITY from small amount of solution is the goal. Researcher Schoen studies foaming of soybean protein hydrolyzed by calcium hydroxide.

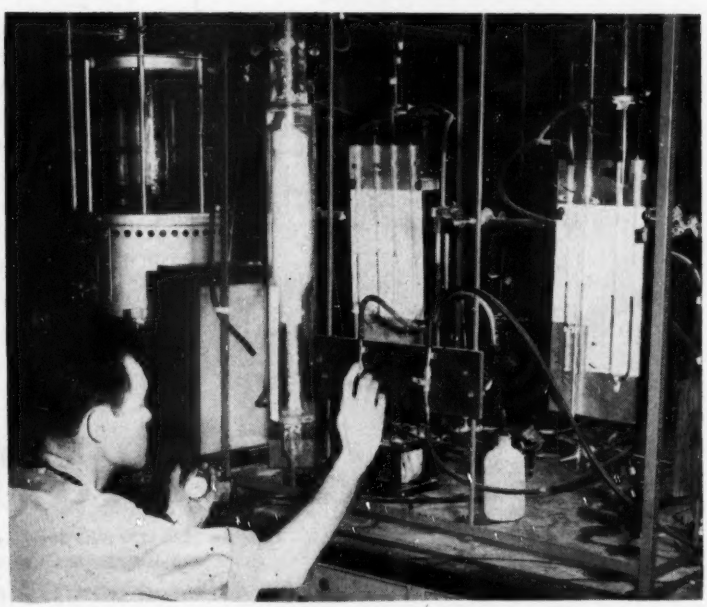
Story begins on Page 38

ed theory: water in foams puts out fires by its cooling effect, and only then can a vapor-proof foam be laid down to keep the fire from re-igniting.

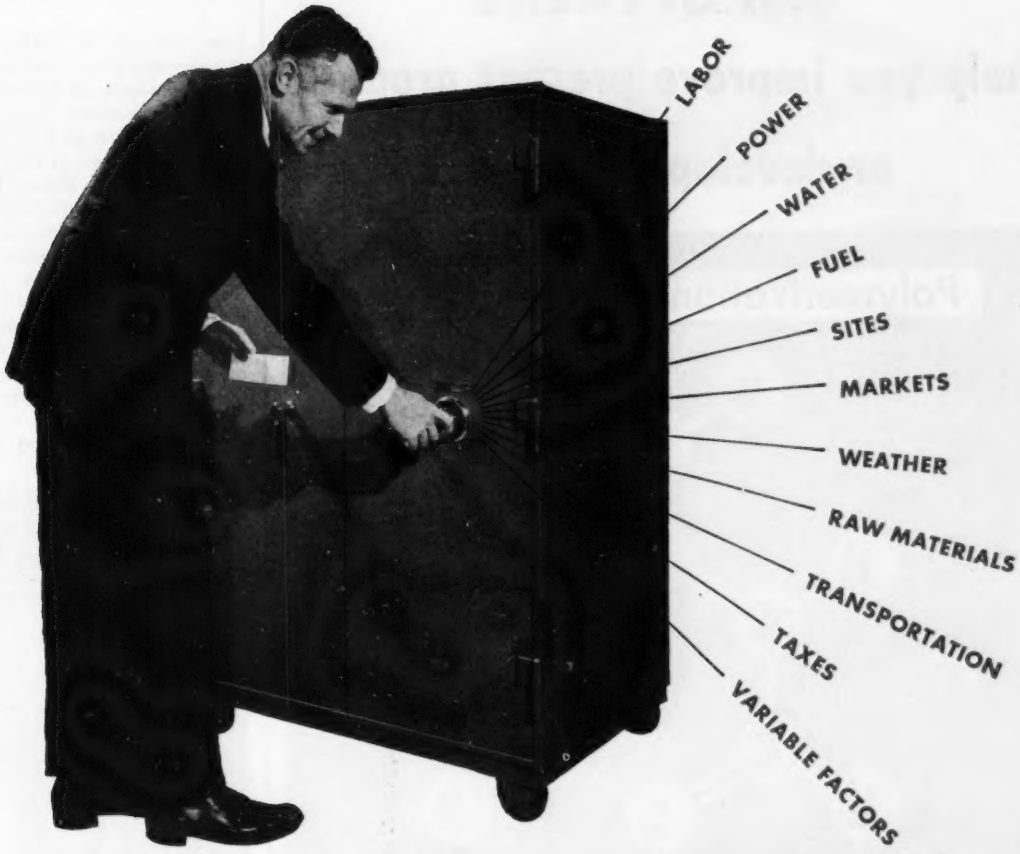
The next step was developing improved foams and equipment for its use in actual fire-fighting. This is where Syracuse's chemical engineering department entered. Directed by Cornelius Grove, the group set to work, established a frame of reference.

First, since Navy researchers proved it was water's cooling effect that put out fires, the foam had to have high water retention. This would mean greater heat capacity for cooling burning fuel or other objects. Then, stability was necessary in order for the foam to blanket fires for any length of time. And last but equally important was the need for high foamability from small amounts of solution.

The Navy project began with a study of foam transmission in pipe-



SURFACE TENSION plays a big part in foam's ability to blanket fires. Investigator Walker measures surface tension of foam solution with tensiometer.

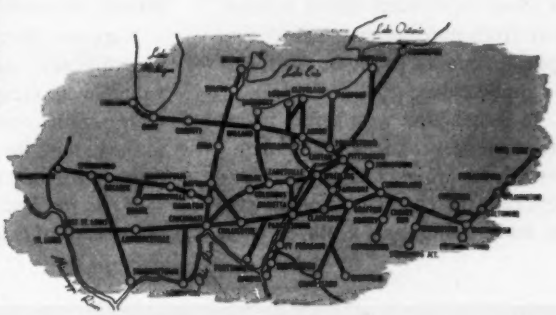


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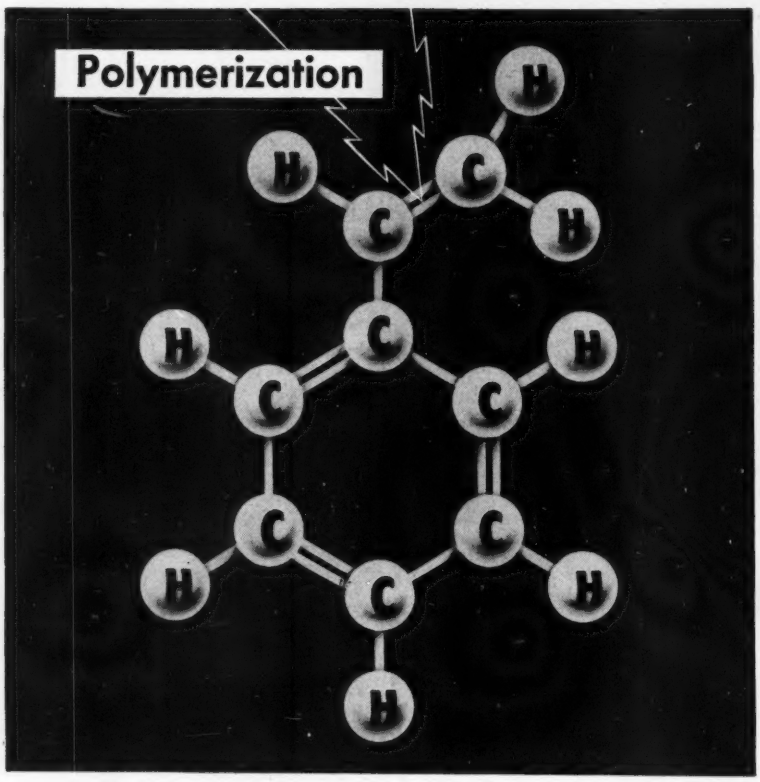
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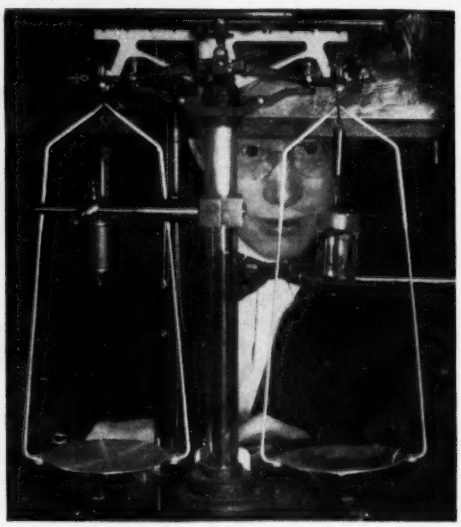
Koppers Chemicals

KOPPERS COMPANY, INC.
Chemical Division, Dept. CW-4112
Koppers Building, Pittsburgh 19 Pa.

lines for use in underground fuel storage tank fires. Correlated with this were problems of corrosion and effects of impurities. Tests were made using a solution of foam in synthetic sea water as well as fresh water. Recently, emphasis changed from storage tank to crash fire-fighting.

Hydrolized protein—obtained from fish scraps and soybeans—was the foam used in all these Navy studies. Protein was hydrolized by calcium hydroxide. The solution was then neutralized with acid and filtered. Phenol was added to give storage stability; ferrous sulfate, to provide heat stability.

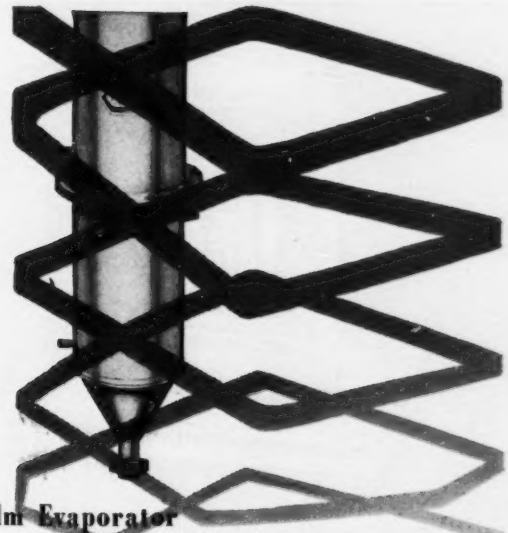
Now, in an effort to develop the most efficient foam possible, Syracuse scientists are working on composition. They are carrying on basic, acid and enzymatic protein hydrolysis to determine the most suitable types and sizes of polypeptide molecules for foams. And coupled with these studies is an attempt to find a liquid that will show improved fire-fighting qualities but could be used in even smaller concentrations than current preparations.



FILM THICKNESS, strength are tested on modified balance by researcher Chang.

Careful not to overlook any lead, the researchers are collecting and testing most commercial detergents. Results so far show that fire fighting and household cleaning generally don't demand the same properties from foams.

As a consequence of these and similar investigations, fires are being brought under control more rapidly. While much of the study is still veiled by security, it is reported that preservation of property alone has more than repaid research investment.



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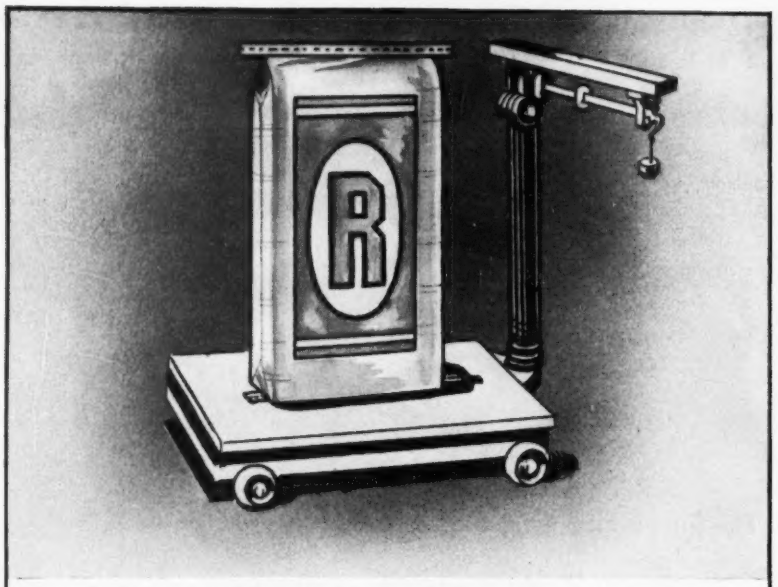
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CW 4-53



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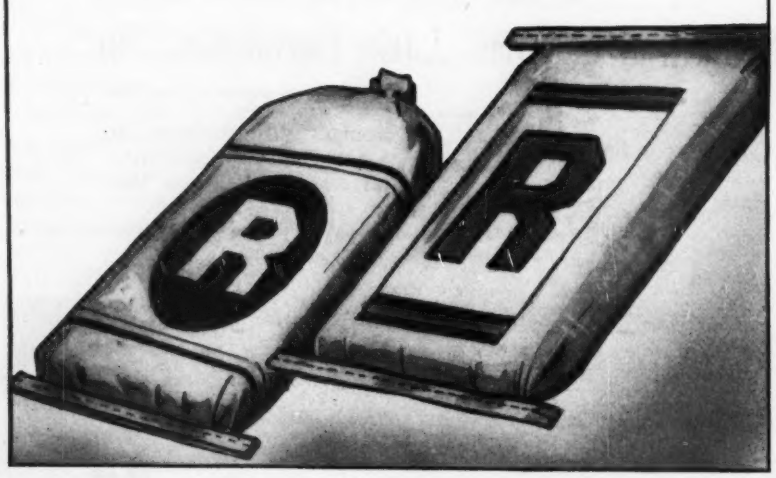
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RESEARCH . . . . . .

Continental Cooperation: Researchers at the Universities of Paris (France) and Liege (Belgium) combined efforts in the war against tuberculosis, synthesized a series of thiosemicarbazones. The group found that various derivatives of 4-hydroxybenzaldehyde and some structurally similar ketones show high "in vitro" tuberculostatic activity.

•

On Location: For the first time in its 86-year history, Parke, Davis & Co. (Detroit) last week opened the doors —via television—of its research laboratory to the public. Sponsored by Michigan Blue Cross-Blue Shield, the television tour lasted 30 minutes, gave viewers a glimpse of P-D's 400-man research staff at work.

•

Perusal Program: Battelle Memorial Inst. (Columbus, O.) has just set up a technological information service. With 60 million pages of technical matter being published every year, Battelle plans to simplify the researcher's task of "finding out what has gone before," will couple improved manual and machine documentation techniques with its large backlog of experience in the field.

•

No Pain: In recent studies at the Univ. of Pittsburgh, scientists discovered that 2-chloroprocaine demonstrated greater local anesthetic action than straight procaine.

•

Riddle: When is a narcotic an antinarcotic? When it is N-allylnormorphine, say Univ. of Pennsylvania researchers. When administered intravenously, the compound proves an effective antagonist for overdoses of many narcotics.

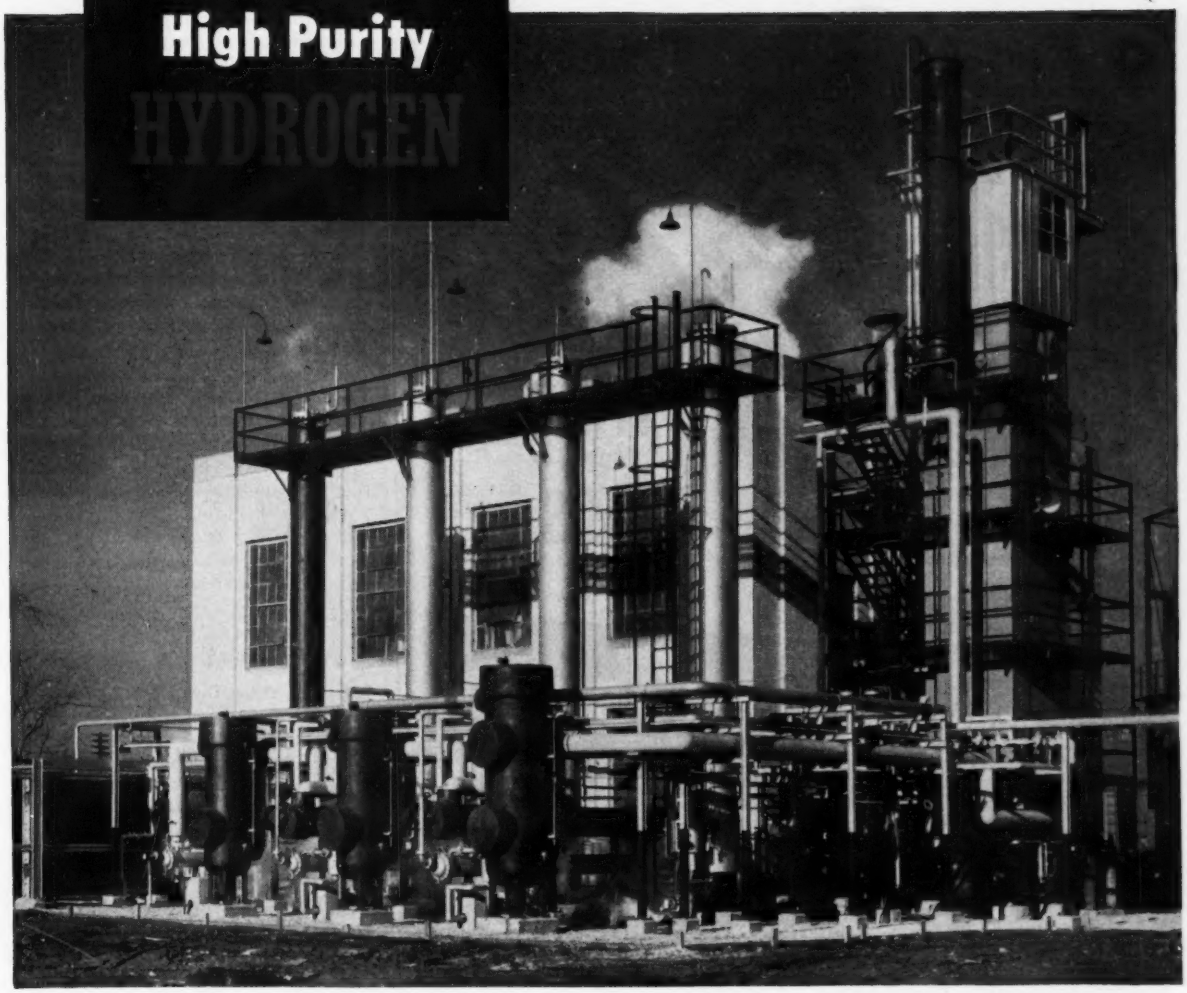
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Vaccinated Eggs: Scientists at Lederle Laboratories Div., American Cyanamid Co. (Pearl River, N.Y.) are using over 14 million eggs for the production and study of modified live virus vaccines, feel that the egg will play an important part in combatting polio. Already on the market: distemper vaccines for dogs and mink; vaccines for fowl pox, Newcastle disease and fowl laryngotracheitis.

•

Polio Partner: Close upon the heels of news of a new polio vaccine comes word from Parke, Davis & Co. (Detroit) that P-D will be able to make it available as soon as the vaccine finishes its field trials. Parke, Davis President Harry Loynd revealed that his company has been working for many years with Dr. Jonas Salk, the

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RESEARCH . . . . . .

Univ. of Pittsburgh scientist who developed the vaccine that shows promise against all three strains of polio.

•

Bacterial Hangover: While alcohol may relax human inhibitions, it has an opposite effect on gram-negative bacteria, declare investigators at Hynson, Westcott & Dunning, Inc. (Baltimore). Results indicate that 1:400 concentrations of phenylethyl alcohol exert effective inhibitory action on the bacteria and could be used for cultures when differential inhibition is desired.

•

Cosmic Sparklers: Arapahoe Chemicals, Inc. (Boulder, Colo.) has just gone into pilot-plant production of a new scintillation agent for liquid scintillation counters, 2,5-diphenyloxazole. Available in 50-lb. lots, the compound will be used in cosmic ray studies and in the detection and determination of radioactive emanations.

New Twist on Lubes

First to clear the Defense-approval hurdle is Jersey Standard's new "non-oil" lube oil for the faster, hotter jet and turboprop engines. It won't have the market to itself, though, for other formulations are undergoing tests, and some will undoubtedly get the military o.k.

Paralleling the chemical process fields as growth industries these days are the aircraft makers who, spurred by war-related government contracts, are in the midst of an extensive, concerted search for faster, lighter, more powerful planes.

In 10 years, makers have gone from a 2,200 hp. piston engine to one which develops a good deal better ful ones are being designed. New enthan 9,300 hp., and even more powergines bring new requirements in everything from engine parts themselves to fuels and lubricating oils.

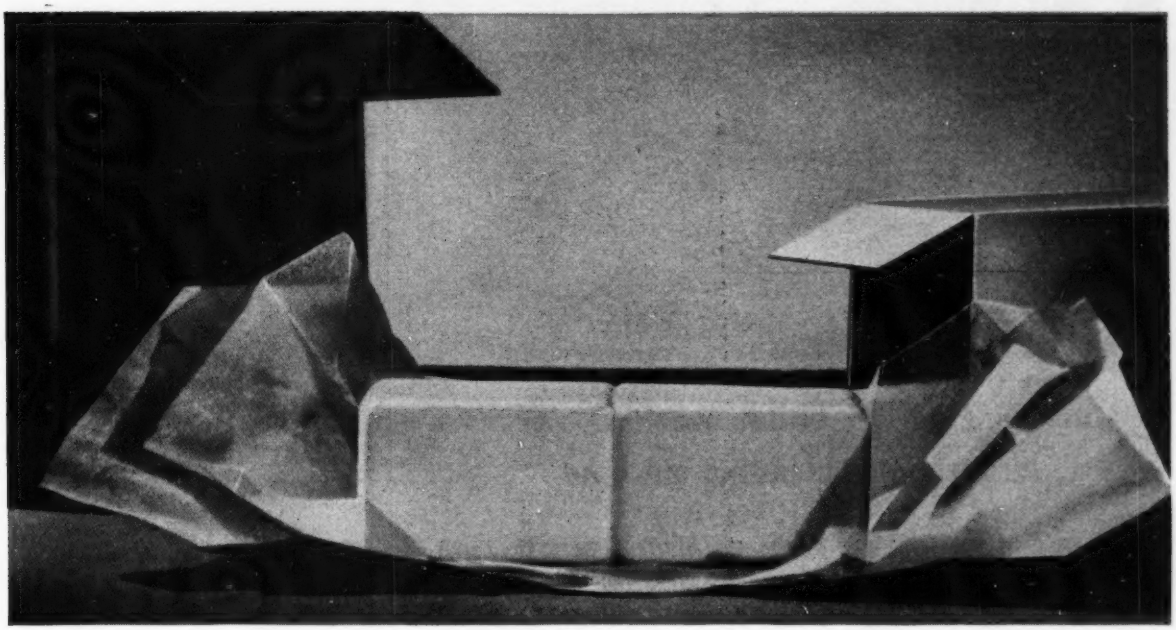
One specific problem that aeronautic specialists must face is the development of lube oils suitable for use in the newer jet or turboprop engines. The requirements: the oil must be light, nonviscous, must maintain relatively similar viscosity between, say, —65 F and 450 F, can't boil away or decompose during normal use. For turboprop use the material must additionally have satisfactory film strength for use as a gear lubricant.

Last week, Standard Oil Development Co. (a Jersey affiliate) got armed forces approval to unveil its entry. At present, SOD's material is the only one that has gained approval under

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the specification MIL-L-7808, which covers such lubricants.

As it looks now, though, the products from two other companies may soon join the list. The materials that, at present, look most promising are the diesters—i.e., esters of diacids like sebacic, azelaic and adipic with five- to eight-carbon alcohols.

A major component in Standard's entry is di-*iso*-octyl sebacate, though it speaks of it as a blend, somewhat analogous to that of the "bright" and "neutral" stock used in ordinary lube oils. The lighter component is probably an adipic ester.

Usual lubricating oils contain such additives as pour depressants, viscosity index improvers, inhibitor-detergents and oxidation inhibitors.

Standard doesn't now use any of the first three types of additives in its synthetic lube oil.

Others now undergoing engine tests are materials supplied by Rohm & Haas (Philadelphia) and Protective Treatments (Dayton). R&H's material is based on its sebacic acid; Protective Treatments' on Emery Industries' azelaic acid production.

Runner-up: Second only to these diesters as jet lube cynosures are the polyglycols. Standard of California has supplied this type of material for evaluation.

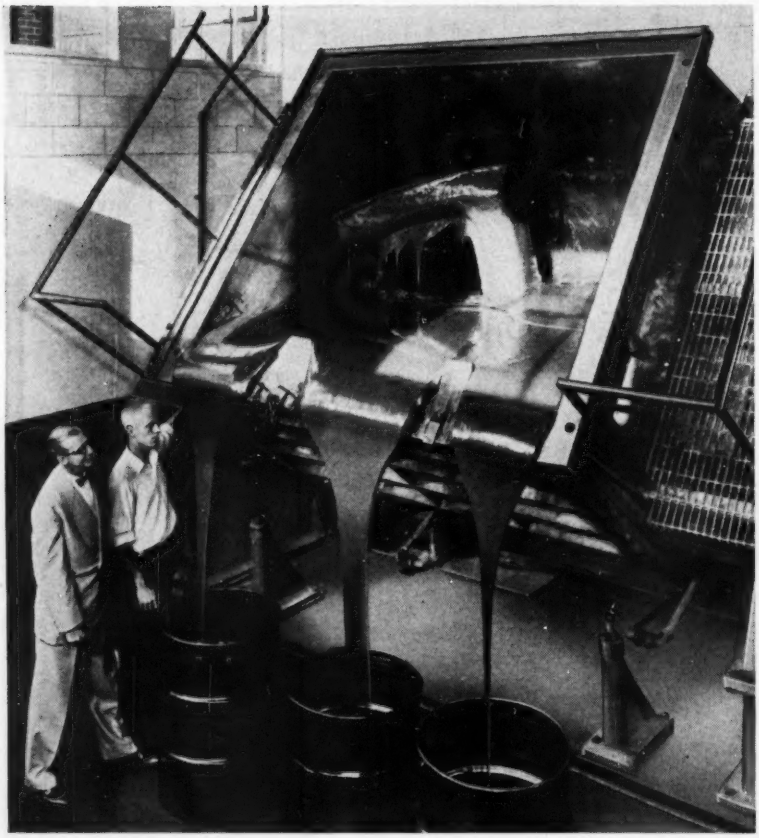
(Several years ago, Carbide & Carbon Chemicals first marketed a polyglycol for lubricating use. The materials are sold under the tradename Ucon. From a technical standpoint, neither the glycols nor the diesters are "oils," but the term, because of its association with the lubrication field, has stuck.)

Other materials have shown promise, but, as yet, are not near to being adopted. The silicones as a class, says the Air Force, aren't good lubricants, and the fluorocarbons don't show a good viscosity index. Such materials could, however, turn the trick.

But even the diesters, best so far, have some drawbacks. As a class, they cause rubber gaskets, etc., to swell. Of the group, the sebacates are the least deleterious on this point, the adipates, the most.

Jersey Standard, in speaking about its product, says it would be able to produce its material from petroleum sources, though, at present, it is not wholly so derived. This would make possible, it reports, a synthetic oil a good deal lower in price—and perhaps could make it competitive with mineral oils for some uses.

But right now, the emphasis is on the military.



BAKER PERKINS builds world's largest color blending machine

Now in operation at the Hilton-Davis Chemical Company's plant in Cincinnati, this huge blender and flushing machine, designed and built by Baker Perkins Inc., mixes 1000 gallons of flushed colors at one time. That's roughly 15,000 to 30,000 lbs., depending on the specific gravity of the colors, nearly three times the capacity of any other blender in use today. The unit weighs 21 tons and took two years to design, construct and install.

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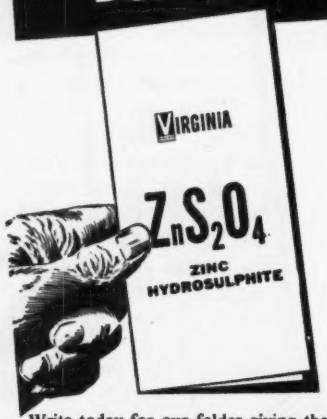
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PRODUCTION....



SMALL DIGITALIS PLANTS are transplanted in May into the fields on Callison's farm near Chehalis, Wash.

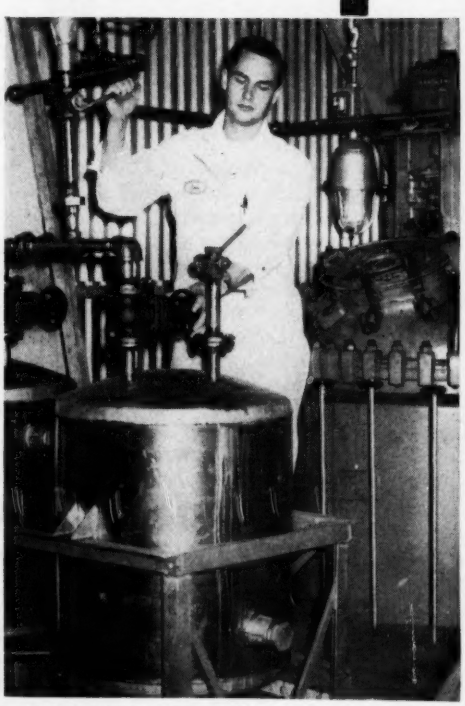
From Seed to Crystal...

After having made a name for itself as a processor of peppermint oil and cascara products, I. P. Callison & Sons (Chehalis, Wash.) is celebrating its 50th anniversary by expanding into two new fields: digitoxin (a glycocide of digitalis) and spearmint oil.

Callison figures it has a competitive advantage in spearmint, looks to a bright future in that field. But it takes a somewhat dimmer outlook on digitoxin. And rightly so, too, for right now, making digitoxin is a thankless task.

The exact market is a matter of dispute. The Tariff Commission doesn't report on it and the trade closely guards its production and sales. Optimists look at it like this: digitoxin is highly prized as a means of regulating heart activity. There are five million heart sufferers in the U.S. who are potential customers for one-tenth mg. a day. That adds up to a market of over 180 kilograms/year.

On the other hand, pessimists point out that digitoxin is not the only compound that will do the job, that digitalis leaf itself still offers stiff competition, that other, newer derivatives are taking the play away from both



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FINAL CRYSTALLIZATION OF DIGITOXIN is done in this laboratory of the Callison plant.

Story begins on Page 50

. . . Integration to Beat Imports

of them. Digitoxin, they reason, is as "big" as it ever will be, and the market will never exceed 20 kilos/year.

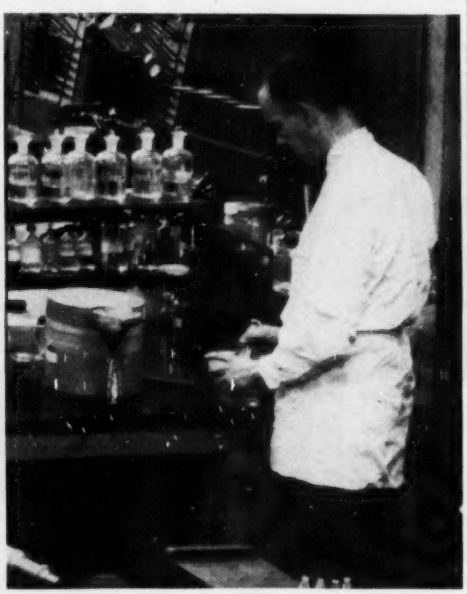
In between, there is agreement that the U.S. can absorb approximately 40 kilos/year. But there are several firms that claim they can supply all of that.

Imports, too, are an important factor. Roussel Corp. (New York City), for instance, puts the market at 40-50 kilos/year, says that as U.S. agent for the huge French pharmaceutical combine, Roussel Laboratories, it can supply that without any difficulty. Its selling price, moreover, which varies from $6 to $6.50 a gram, is one that American firms have a hard time matching. Roussel claims that France is naturally endowed with a digitalis leaf that runs high in digitoxin, and, as a result, can undersell U.S. producers.

American firms, of course, don't agree with that. And though they freely admit that foreign competition suppresses the price to a point where the profit margin is small, several firms are presently producing it.

Wyeth is generally considered the biggest, probably turns out about 15 kilos/year. Wyeth cultivates its own digitalis leaf, also buys it from others. S. B. Penick (New York City), one of the biggest suppliers of the leaf, has had a long-standing interest in digitoxin.

Even on the West Coast, Callison will not be the only producer, for Hosco Chemical Works (Los Angeles) has been in substantial production for about three years. President Werner



RESEARCH DIRECTOR SHAW: More economies to come.

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Octadecadienoate		✓				✓
Hydroxystearate	✓	✓	✓		✓	
Acetoxystearate	✓	✓	✓			
Undecylenate	✓	✓				

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Story begins on Page 50

Bentler reports it buys leaf principally from the U.S. and that it is using a process he brought over from Germany.

Supplier to Producer: Callison's interest in digitoxin stems from its position as a supplier of wild digitalis leaves to other firms. For as digitoxin imports started moving in, Callison found itself with a dwindling market and started looking into the idea of processing it.

It's now, however, basing its hopes on the cultivated leaf rather than the wild one. Its 100-acre experimental farm program has already produced techniques for more economic handling and for better quality control. The current crop, in fact, is the first to be harvested mechanically by Callison, at a considerable savings in labor. The firm figures that cultivated digitalis can be produced for about half the $0.90-1.25 cost of the wild leaf. And this year, for the first time, Callison's cultivated leaf will supplant wild collections.

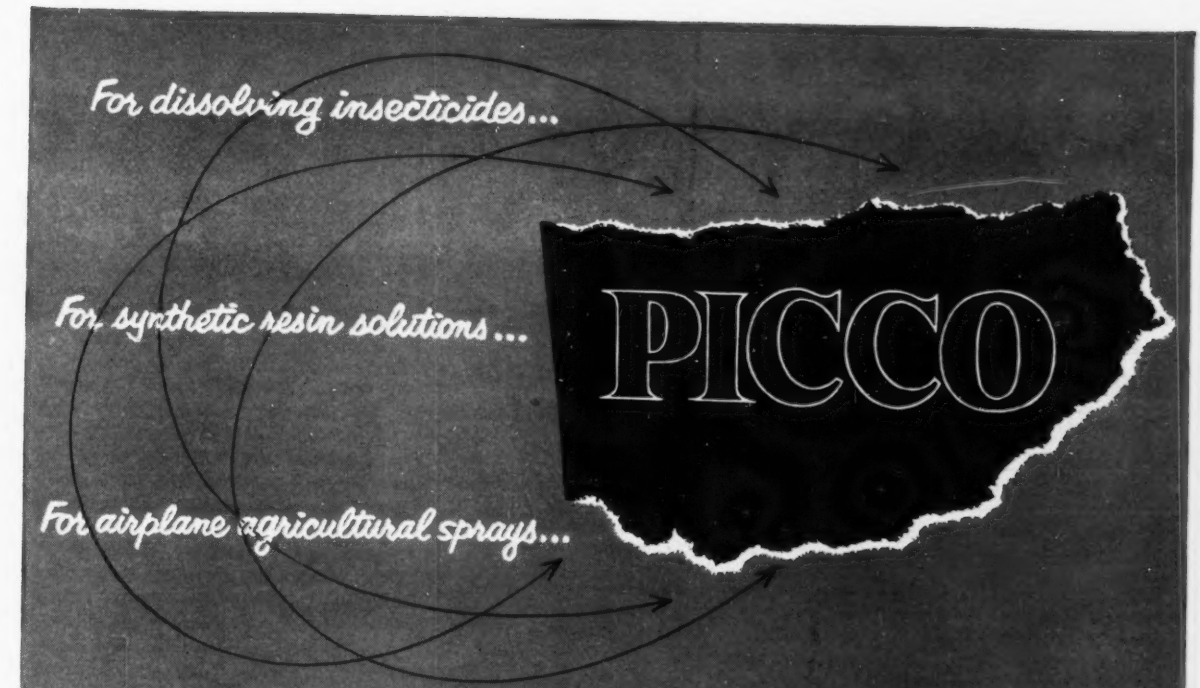
Callison reports it is setting its sights on an output of 12 kilos/year. It will use a combination of methods developed in Germany during World War II and modified by American industrial producers in the late '40s.

These modifications include new arts such as chromotography; new solvents such as furfural and various chlorinated solvents like chloroform; and new arrangements of the processes to adapt them to modern extraction and concentration equipment, thereby reducing labor requirements, increasing batch sizes and providing critical control of variables.

Down on the Farm: The tiny seeds are started in cold-frames in January, transplanted to the fields in May or June after careful watering, fertilizing and weeding. Since digitalis grows slow and won't compete with the weeds, the crop requires hand hoeing at first and mechanical cultivation as maturity approaches. Extensive irrigation is required during the dry months of July and August.

The crop is harvested in October and November, with yields of 2,000-2,500 lbs. of the dried leaf per acre. Digitalis usually withstands the mild coastal winter and yields a small spring crop and a second fall crop.

The farm program enables Callison to cut the leaf in a quantity just sufficient to supply the dryer capacity, thus eliminating spoilage. The green leaf is dried in hot-air dryers at about 140-150 F for 12-24 hours. This brings the moisture content from 85% to 4%. It's then rough-ground, blended



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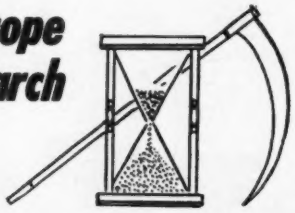
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into 1,000-lb. lots, and packed in 125-lb. fiber drums until required for processing.

Elusive Substance: The next step is getting the digitoxin from the leaf, a complex and exacting process. Starting with several hundred pounds of dried leaf, you wind up with barely enough material to cover your fingernail. What's more, digitoxin is an elusive substance easily lost in processing and in the continuous washing and re-washing that are all part of the 32-34 step process.

In the extraction, 500 lbs. of the ground leaf are first moistened with water in a plastic-coated ribbon mixer, then mixed with 40% methyl alcohol. After maceration for 12-16 hours, separation is carried out by suction filtration in 4-ft.-diameter neutches.

Next, the filtrate is washed, combined and precipitated with lead acetate. Liquid is evaporated under vacuum, filtered and extracted with chloroform in a glass-lined Pfaudler vessel. After the chloroform is boiled off, the solid is defatted with petroleum naphtha, extracted further with chloroform, evaporated to dryness, dissolved in alcohol and decolorized with activated carbon.

The alcohol solution is then reduced in volume under vacuum and fractionally crystallized with various solvents such as acetone, alcohol, and a mixture of chloroform, methanol and ether, Yellow pigment can be removed by treating the dry material with benzene.

Yields currently range from 15-22 grams per 100 lbs. of dried leaf, depending on the quality of the leaf. As much as two lbs. of crude digitoxin may be present in 500 lbs. of dried leaf, but less than 40% of that is now recovered.

Says Research Director Gail L. Shaw, "At present the process has been set up primarily to minimize labor and equipment costs. Considerable improvement is expected as development work is carried out. It seems natural to expect that maximum economies can be effected under a program that integrates all work from seed to final crystal." One of the improvements that might be expected is increasing the yield.

Callison makes it clear that it anticipates difficulty in attempting to compete with the cheap foreign material. It does think that U.S. suppliers may be willing to pay more to an American firm to insure a source of supply in times of emergency. With financial encouragement from either the government or industry, it is ready to expand its output to meet any conceivable demand.

BACK IN THE 1880's

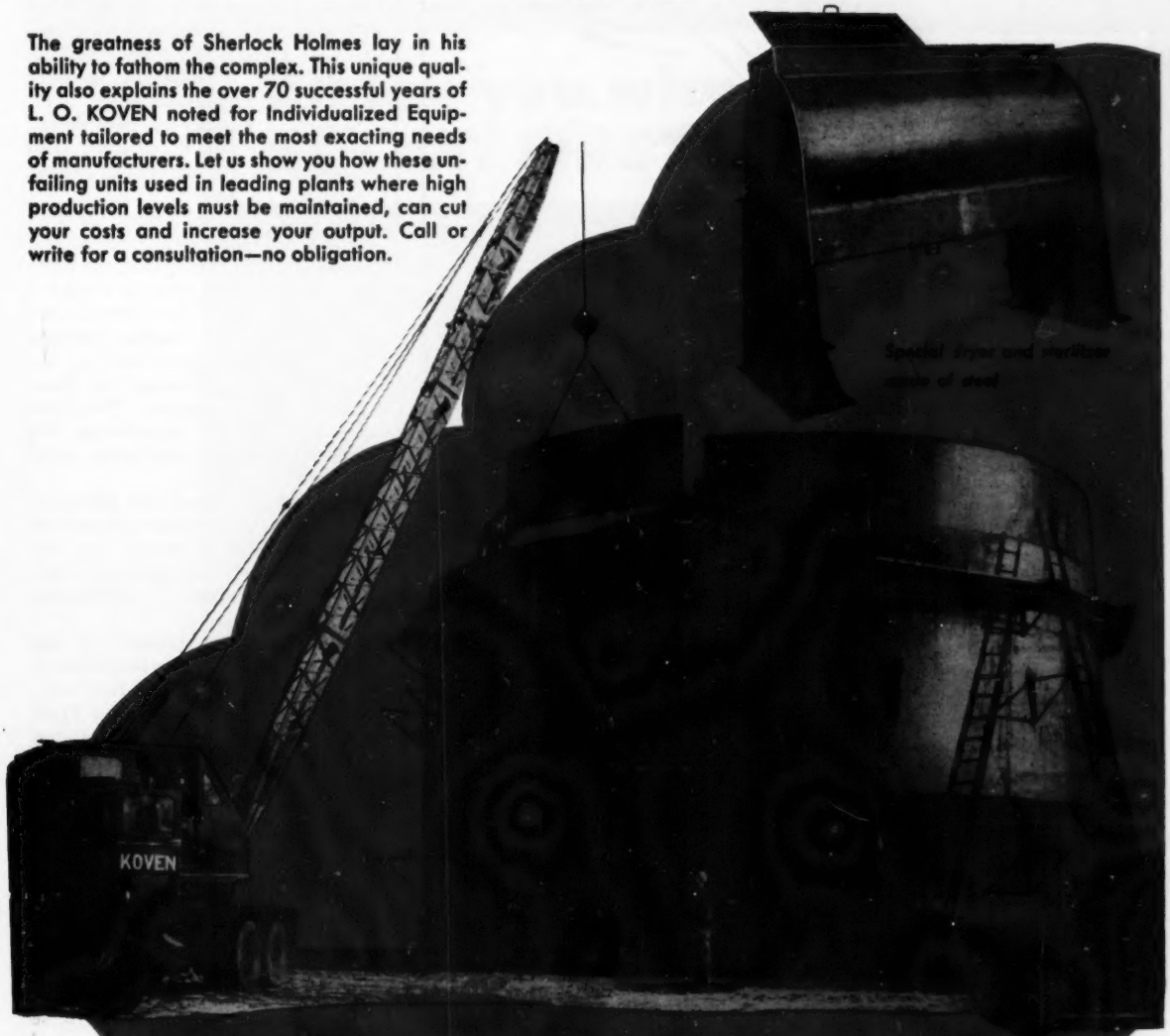
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Double Assault

The new $34-million chemical processing plant operated for the Atomic Energy Commission by American Cyanamid Co. (CW Newsletter, Mar. 21) is making an assault on two major barriers to commercial development of atomic power reactors: high costs and contamination problems.

Designed to recover used fissionable materials, the plant is located at the AEC's National Reactor Testing Station near Idaho Falls, Idaho. And according to L. E. Johnston, manager of the Idaho Operations office, it incorporates a number of new design concepts expected to produce data important to the economies of reactor utilization.

The new plant will attack the high cost of reactor operation from several directions. In the first place, the processing system used there is designed to lower the cost of fuel. Here's how: fuel elements in reactors become fouled with fission products that absorb neutrons, thus hamper the chain reaction within reactors. The new plant provides for reprocessing the fuel to remove these deleterious materials.

In the second place, the plant design permits reclamation of fissionable products from used reactor fuel elements without the expensive and complicated remote-control mechanisms previously used.

Sagebrush Site: Located amidst Idaho's vast southern sagebrush desert, the plant was more than two years a-building. Bechtel Corp. (San Francisco), contractor for the job, started excavation in Aug. '50, didn't complete it until Dec. '52. Foster Wheeler Corp. (New York City) was the architect engineer, but the process designing was done by the AEC's Oak Ridge National Laboratory.

Unlike earlier models, the plant is built for direct maintenance. Previous radioactive chemical processing plants had costly provisions for replacing defective units by mechanisms operated by personnel outside the area. These remote-control devices were deemed necessary because of the intense irradiation from fission products.

At the Idaho unit, however, the idea will be to demonstrate the feasibility of decontaminating the individual cells in which chemical processing is carried out by allowing workers to enter and perform maintenance duties. But the work will still be done behind thick, shielding walls.

All told, Cyanamid will employ about 300 people at the site. It will process used fuel elements from a



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variety of reactors. Reprocessing these fuel elements is an integral part of the expense involved in reactor operation, is a major item influencing economies of production. Fission products removed from the used fuel elements will be concentrated, then placed in large underground storage tanks.

Another barrier to commercial exploitation is control of radioactive gases. This is particularly important since power reactors will be located close to populous areas. The new plant will test equipment for removing the gases, and the engineers hope to learn whether or not it's possible to control them.

Here are some statistics on the plant:

- To protect workers from radioactivity, a ventilation system will draw air into processing areas and away from areas containing personnel. The system will provide the plant with 170,000 cu. ft. of filtered and washed air per minute.
- It contains 38 miles of stainless steel piping and 125 miles of aluminum and copper tubing and carbon steel pipe. Approximately 35,000 sq. ft. of sheet stainless steel was used in its construction.

Oxygen Gain

As expected (*CW, Jan. 31*), W. R. Grace last week officially committed itself to using the Texaco Development Co.'s partial oxidation process for synthesis gas in its a-building $19-million ammonia-urea plant in Woodstock (Tenn.). The committment, also as expected, came in the form of a $1-million oxygen generator purchased from Air Products, Inc., (Emmaus, Pa.).

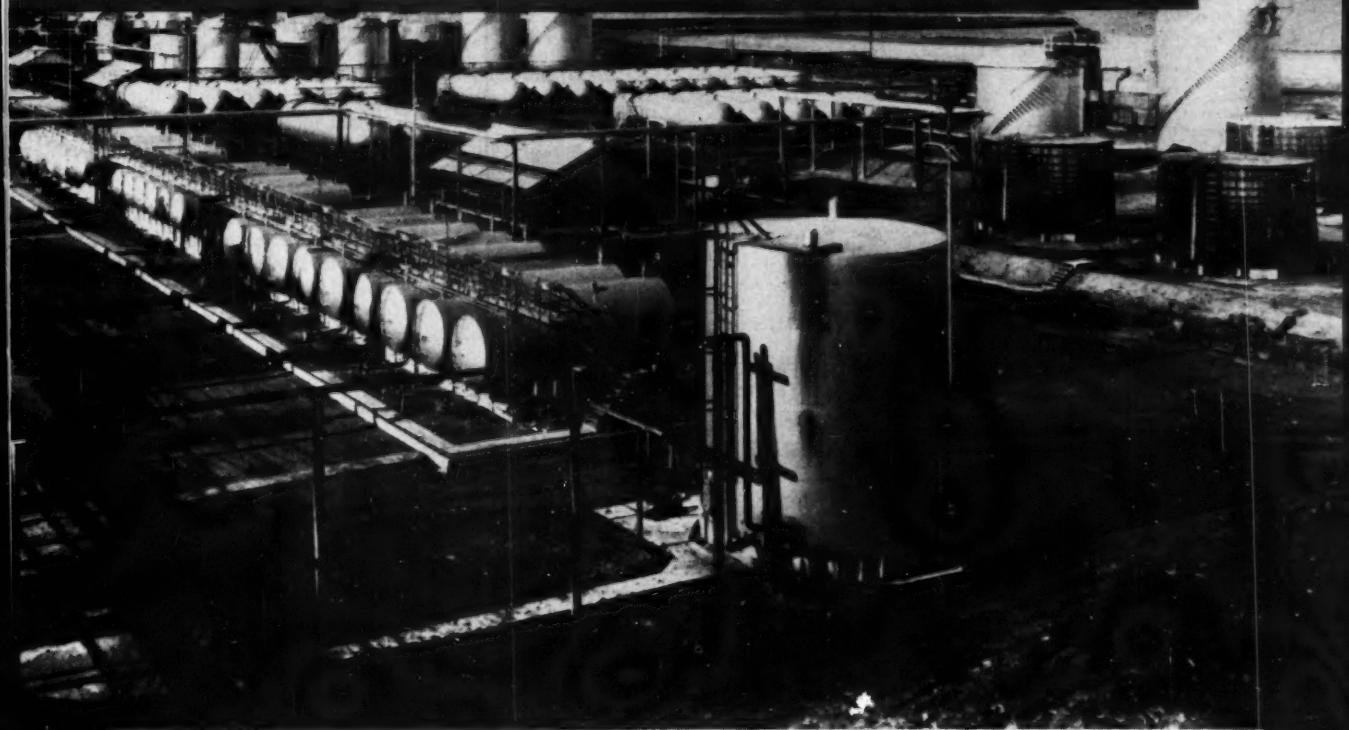
The unit is billed by Air Products as the world's biggest high-pressure, liquid-oxygen generator. It will be used to separate air into 200 tons of oxygen and 300 tons of nitrogen daily.

The process will be the same as that employed by Spencer—also buying an Air Products' oxygen plant—and Deere (*CW, Aug. 30, '52*). In it, air is separated into oxygen and nitrogen and the oxygen is used to oxidize natural gas to synthesis gas (carbon monoxide and hydrogen). That, in turn, is oxidized with steam to produce carbon dioxide and more hydrogen. Nitrogen (from the original separation) reacts with the hydrogen to form ammonia.

Grace also revealed that Foster Wheeler will be the constructor, and that the Casale ammonia process and Pechiney urea process will be used.

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Fluoride Detector: Stanford Research Inst. (Palo Alto, Calif.) has just developed a new method for measuring hydrogen fluoride in the atmosphere. In the method, a roll of filter paper is impregnated with a fluorescent metal salt, then transferred to another spool. Since the concentration of hydrogen fluoride is directly proportional to the degree of fluorescence, variations can be measured photoelectrically and results that can be recorded give a continuous measurement of the halide. Stanford figures the procedure should prove useful in atmospheric pollution studies. Older methods for measuring the concentration of hydrogen fluoride give only an average concentration over a period of time.

•

In Two Speeds: The Industrial Div. of Minneapolis-Honeywell Regulator Co. (Philadelphia) is introducing a new chart drive that steps up the speed when a variable exceeds predetermined limits. It's aimed for con trol point adjustment during start-up or any time an upset occurs in processing.

•

Prices Pared: General Electric Co.'s Lighting and Power Rectifying Dept. (Schenectady, N.Y.) has recently introduced a new line of metallic rectifier power supplies for electroplating and anodizing operations. The new line is more efficient, simplifies operations and, says G.E., is cheaper because standardized parts are used extensively. Included are manually controlled and automatically regulated power supplies, also special equipment for barrel plating and precision jobs in the lab.

•

Open and Shut: Blaw-Knox Co. (Pittsburgh) now reports a quick-opening (or -closing) door for use on pressure vessels. It can be opened or closed in a matter of seconds by simply expanding or contracting a split ring. Usually, doors on pressure vessels are held shut by nuts and bolts and opening the door involves removing the nuts by hand. This can take 20 to 30 minutes. One manufacturer in the rubber industry, for instance, installed a Blaw-Knox door, cut the time for the operation from 20 minutes to 30 seconds.

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Patents Released: Bringing the total to 545, the Atomic Energy Commission has transmitted to the U.S. Patent Office for registry . . . descriptions of 15 patents it will license on a nonexclusive, royalty-free basis. Copies of the patents are available at the U.S. Patent Office, Washington, D.C.

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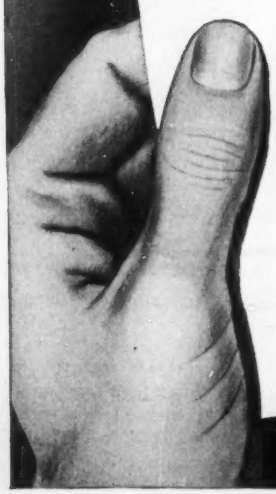
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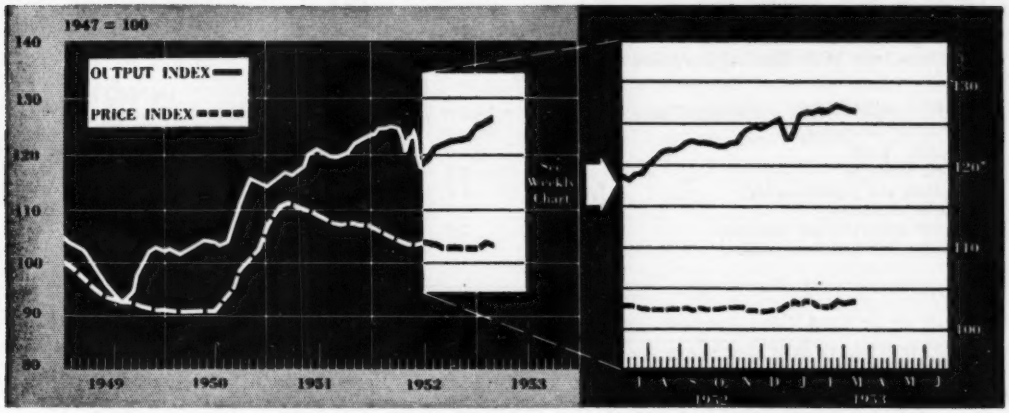


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CW Index of Chemical Output—Basis: Total Man Hours Worked in Selected Chemical Industries
CW Price Index—Basis: Weekly Prices of Sixteen Selected Chemicals

MARKET LETTER

There are some hard dollars-and-cents reasons behind RFC's holding its second quarter alcohol purchases to 16.4 million gals. as against the original 20-million gal. offer to buy. As indicated here (CW Market Letter, Mar. 28), most producers did nibble at the bid, but with quotes ranging up to 42¢/gal.

Successful contract wranglers—at a reported 32¢-36¢/gal. figure—are Publicker Industries and Harris & Purdy Co., coincidently, both of Philadelphia. The former will supply the government's synthetic rubber program with about 10 million gals. of domestic alcohol; the latter, some 6.4 million of West German imported material.

After blotting up the lower-priced alcohol the agency decided to hold off picking up the difference—about 3.6 million gals.—between the 20 million it sought and the 16.4 million it bought for April, May, June delivery. Economy-minded reason: the other quotations submitted seemed too high a price to pay for the relatively small amount remaining. Besides, says RFC, we'll be back in June for more.

A more uniform price, however, now prevails in the copper market. Recent tag manipulations—one cut, two advances—establishes a firm 30¢/lb. level for domestic metal.

The actions may well pressure Chilean copper—still being offered here at 36½¢/lb.—down to more "realistic" levels.

On the other hand, a model of stability in the chemical market place suffered a surprising 5¢/lb. cut last week. Resorcinol, undergoing only its fourth fluctuation in more than a decade, is now pegged at 77½¢/lb. (tech. grade, c.l.). This in the face of rising benzol schedules.

Koppers Co., Mr. Big in resorcinol, initiated the decline, explained the new price reflects savings in basic manufacturing costs. Chances are the reduced tag will become standard for the industry.

But a firming in phosphates is behind higher schedules to be posted on phosphoric acid effective May 1. New tank car prices of at least one major producer will be boosted from the current $4.90 to $5.10/cwt. for 75% material. Also in the works—a 20¢/cwt. hike for NF, 85% acid.

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
CHEMICAL WEEK Output Index (1947=100)	126.8	127.0	124.8
CHEMICAL WEEK Wholesale Price Index (1947=100)	104.3	104.1	103.3
Bituminous Coal Production (daily average, 1,000 tons)	1,367.0	1,353.0	1,639.0
Steel Ingot Production (1,000 tons)	2,216.0	2,190.0	
Stock Price Index of 14 Chemical Companies (Standard & Poor's Corp.)	256.2	260.0	236.7

MONTHLY INDICATORS—Foreign Trade (Million Dollars)	EXPORTS			IMPORTS		
	Latest Month	Preceding Month	Year Ago	Latest Month	Preceding Month	Year Ago
Chemicals, total	$57.4	$59.4	$76.2	$21.4	$20.2	$26.7
Coal tar products	3.9	3.6	6.4	2.6	4.3	3.4
Medicinals and pharmaceuticals	13.6	15.2	22.1	.3	.4	.5
Industrial chemicals	9.7	9.1	13.3	6.0	5.2	11.5
Fertilizer and fertilizer materials	2.4	3.6	3.8	11.0	9.1	9.9
Vegetable Oils and fats, inedible	1.7	3.2	5.5	6.5	8.9	10.4

Although more and more chemicals blossom out with higher tags, don't look for any runaway price inflation. Reason is basic: most items are not short; hence pencil-wielding producers will hesitate to hike prices any more than enough to cover manufacturing costs that rose while price ceilings were in effect. Buyer resistance can be no idle threat.

Pentaerythritol users are shelling out a penny more per pound this week. One major producer's schedules were hiked that much in a move termed a "readjustment" of the 33¢/lb. (c.l.) price since Jan. '52.

New prices: 34¢/lb. for carload or truckload lots; 35¢ l.c.l.

Benzol consumers—still taking all available coal-tar material—aren't showing too much resentment toward higher prices—yet. Increases, which became effective last week, advanced most major makers' tags between 1½¢-4¢/lb., depending on shipping points.

The few producers who have not as yet gone along with the hikes will fall in with the newer 36¢-42¢/gal. quotations before the end of the month. Reason: the brisk demand tempo is expected to continue.

Early last week the Office of International Trade announced shucking of export controls on straight polystyrene moulding and extrusion compositions, as well as its emulsions, sheetings, extrusions and other unfinished forms of polystyrene resins.

The usual areas are excepted, of course, from the no-export-license-is-required ruling: Iron Curtain countries, China, Hong Kong, Macao.

There'll be less copper sulfate leaving the country during the next three months. In a move designed to meet anticipated heavy seasonal domestic demand for the product, OIT set the second quarter copper sulfate export quota at 15 million lbs.—some 10 million lbs. under the first quarter's allotment.

However, a supplementary quota may be issued if production is greater—or domestic consumption smaller—than is now expected.

Footnote to recent sulfur increases: while sulfuric acid stocks are more than ample to cover current demand, chances are quotes will go up when higher-priced sulfur filters down to acid makers.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending April 6, 1953

UP

	Change	New Price		Change	New Price
Ethyl alcohol, pure, tanks	$ .08	$ .48	Pentaerythitol, tech., bgs., c.l.	.01	.34
Isopropyl, 95%, dms., c.l., dlvd.	.03	.5575	Benzol, pure, nitration, tnks., wks. Bethlehem, Pa.	.0325	.42

All prices per pound unless quantity is stated.

(Advertisement)

CHEMICALS OUTLOOK

April 1953

This news bulletin about Wyandotte Chemicals products and their applications is published to help keep you posted. Perhaps you will want to route these and subsequent facts to other interested members of your organization. Additional product information, through Wyandotte research and technical service facilities, and trial quantities of Wyandotte products are always available upon request. May we serve you?

NEW WYANDOTTE CHLORINE-LIBERATING COMPOUND

New Wyandotte Halane (1, 3-dichloro-5, 5-dimethylhydantoin) shows amazing promise for those applications where a powdered, chlorine-liberating compound of unusual stability is required.

Extensive laboratory experiments demonstrate the suitability of Halane as a laundry bleach. Loss of available chlorine from dry Halane is very slow and there is no potential danger of explosion as in some bleaching compounds.

The properties of Halane indicate its possible suitability for the shrinkproofing of wool; sterilizing ion-exchange resin beds; sterilizing paper and pulp against microbiological attack; use as a rubber bonding ingredient; chemical intermediate for amino acids, drugs, insecticides; use in extreme pressure lubricants, germicidal rinse compositions and in odor removal for organic products.

Halane is available in multi-drum quantities. Larger orders can be handled on reasonable notice. Write our Development Department for free samples, data sheets and price schedules.

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Wyandotte now offers Methyl Bromide, a powerful, highly penetrating fumigant (lethal to rodents) which has exceptionally high killing power for insect pests in packaged foods, dried fruits and vegetables, stored grains and grain products, plants, cotton seed, seed beds and ant colonies.

Methyl Bromide (a liquefied gas) is easy to apply, has high killing power, is non-flammable, and leaves no residual odor (evaporates completely upon aeration).

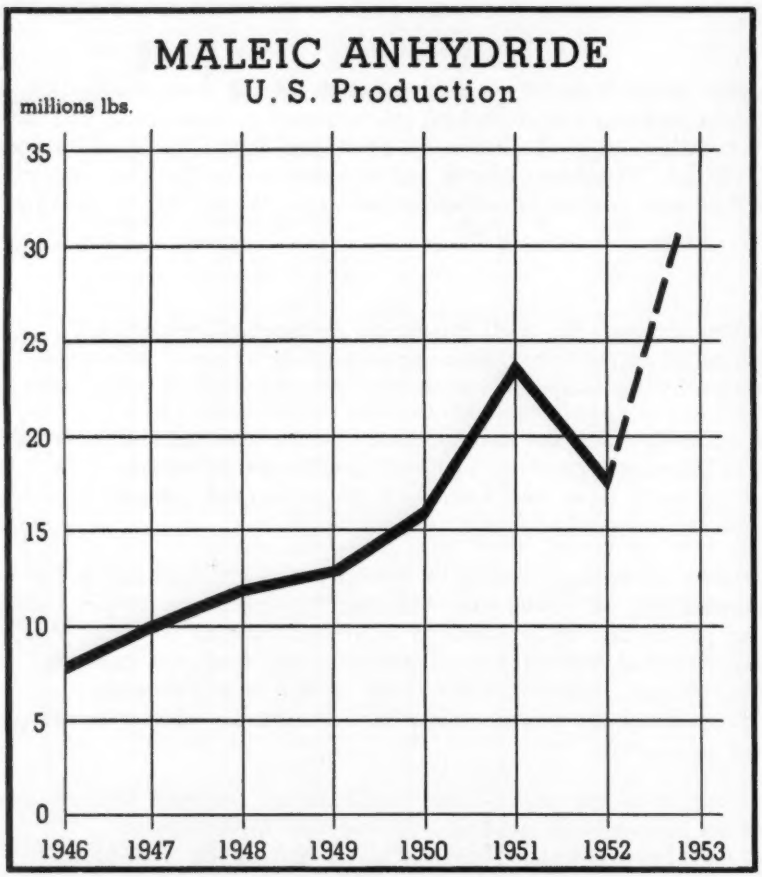
Available in 1-lb. cans under pressure, also in 10-lb., 50-lb., 100-lb., 150-lb. and 400-lb. steel cylinders. Contact Wyandotte Agricultural Chemicals Department for Methyl Bromide and other agricultural chemicals, for both domestic and export orders.

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MALEIC ANHYDRIDE: Glamor interest is rising.

Maleic Quickening

Plastic car bodies, soil conditioners, other consumer products spark new growth for maleic anhydride.

Shooting at over double last year's output, 1953 production may be only the first of successive boosts.

Raw material price hurdle rises as inadequate supply barrier fades away.

With plastic car bodies, soil conditioners and growth regulators getting the spotlight in today's news, interest in maleic anhydride-consuming products has reached fever pitch. Biggest popular play is being given the end-use potentials of the reinforced-type resins. With boats, pipe, and bath tubs soon slated for production (*CW, March 7*), the polyesters are expanding at a terrific clip.

And so maleic anhydride, vital component of the polyesters, is now due for a jolt after a long but heretofore unsensational career.

Based upon its current pace, maleic anhydride production is bidding to attain a possible record of 40 million lbs. this year. Compared with its previous high in 1951 of 24 million lbs., maleic will be taking a big hop.

Even greater heights are predicted for the following years. In terms of present day trends of sure-fire uses alone, the consumption pattern by 1954 might shape up as shown on page 72.

Still Champ: Biggest outlet for maleic continues to be those versatile finishes, the alkyds. Although the maleic alkyds are overshadowed by their big brothers, the phthalics, they are expected to maintain their steady growth in the coatings field. This expansion, based upon special properties imparted by the maleic molecule, looks certain even under a continuation of the 15¢/lb. price differential between maleic and phthalic anhydrides.

In the midst of general alkyd increases, one form, the hard finish rosin adducts, have sagged a bit. Consumption of these materials for furniture finishes and nitrocellulose lacquers has apparently passed its peak.

Closing In: But it's in the fast running field of casting resins and low-pressure laminates that maleic is shifting into high gear. At today's growth rates these polyester plastics stand to take number one position, as maleic anhydride consumers, away from the alkyds within the next three or four years.

Pinpointing the demand pattern for polyesters is an uncertain task. For instance, demand for plastic car bodies or boat hulls may be delayed a while, may not make a big spurt for a couple of years. On the other hand, the market for some products may spring up overnight; plastic air-conditioning cabinets, for example, are now starting to move into full-steam production.

Averaging the delayed and false starts together with the surprise outlets, the trend, taken conservatively, seems to follow the polyester growth curve projected by the Society of Plastics Industry. Its predictions for the next three years look this way:

Polyester Production

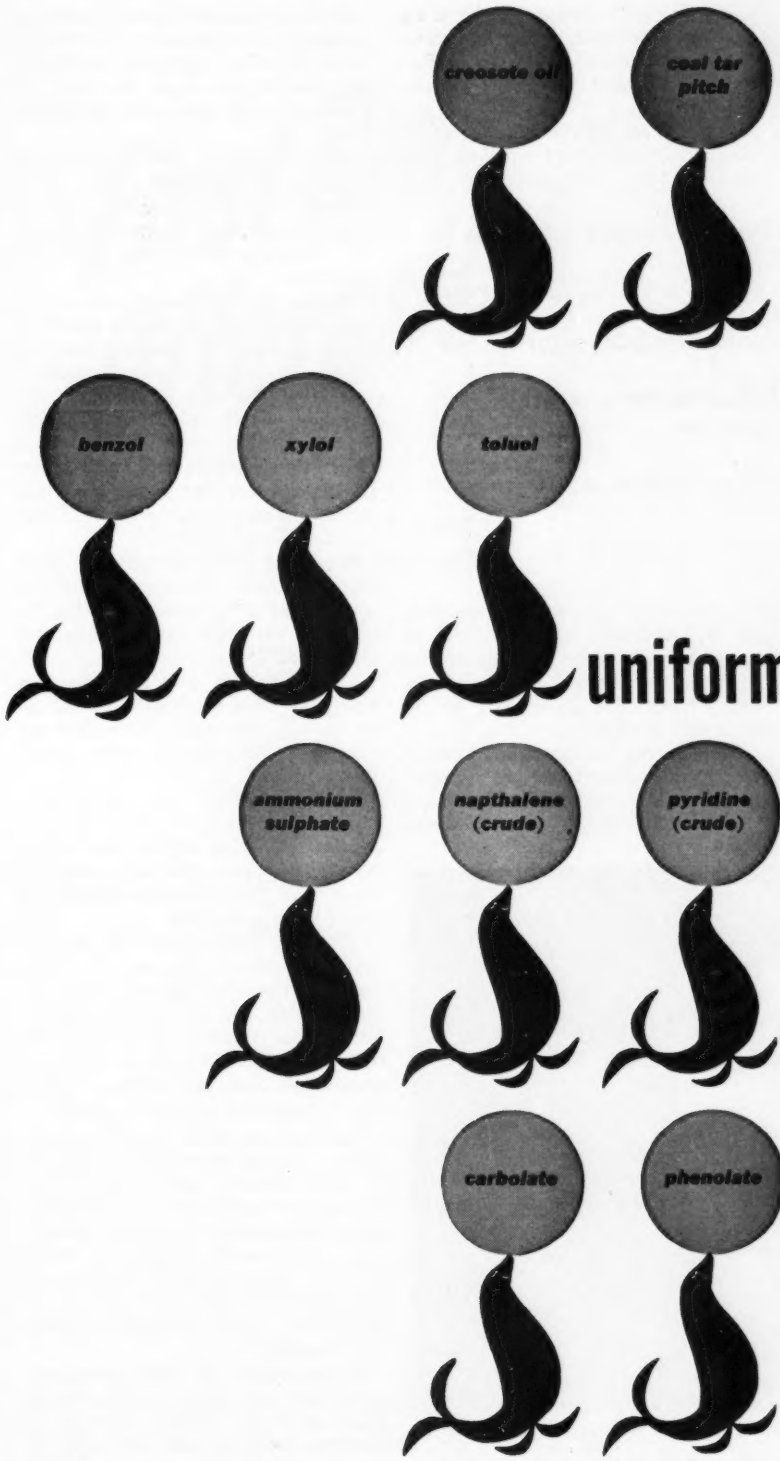
	Millions Pounds
1953	27
1954	38
1955	50

Illustrating the uncertainty of the polyester future, some estimates push the 1955 figure up to 70 million lbs.

Big bump for maleic anhydride, of course, lies in its representing from 22 to 25% of the total weight of the polyesters.

In Oils: During World War II, maleic established itself in the paint and varnish field. When quick-drying tung oil supplies from China were cut off, "maleinized" oils, upgraded to satisfactory drying properties, were accepted as satisfactory substitutes.

Under today's drying and non-drying oil price patterns, volume of maleic used for up-grading has been well maintained. As long as processors find it economically feasible to treat oils with maleic, chances are they will continue. Reason: whiter and nonyellowing finishes are possible through "maleinized" oils in contrast



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to untreated linseed oil products, for example.

Production Pattern: With encouragement from the Defense Production Administration, official capacity for maleic is being boosted from 27 million lbs. as of January 1951 to a 1955 goal of 49 million lbs./year.

and with captive usage playing a big part, are Reichhold, American Cyanamid, and Carbide and Carbon. Barrett and Koppers are also in the picture.

Some years ago, several processes for making maleic appeared competitive. But today, with improved yields and increased raw material supplies, the die definitely has been cast in favor of the benzene process. All the producers mentioned except Barrett and Koppers are understood to be using this method.

Carbide and Carbon seems to have permanently abandoned its unsaturated-hydrocarbon-gases process.

Co-product maleic from phthalic anhydride formerly loomed larger as a source. In the form of a 5% recovery from phthalic anhydride operations, this source was used by American Cyanamid and Monsanto for several years.

Today Koppers and Barrett continue to recover the maleic. It is understood that in Barrett's case, at least, the recovery is prompted partly as a solution to a stream pollution problem.

Rising Star: Maleic anhydride consumption would compound rapidly if and as the price is lowered. Realizing its great chemical reaction potential, maleic at the price of phthalic, for example, would likely outstrip demand for the latter. And even with a higher-than-phthalic tag, some industry experts feel that before too many years, maleic consumption will approach that of phthalic.

Until the plastic car bodies, pipe, boats and bath tubs appeared on the scene, most of the uses (excepting the alkyds) were for manufacturing of chemicals.

And although important from a utility standpoint, these chemical intermediate uses have not added appreciable quantities to maleic anhydride demand.

Now, however, with these new products providing the key, the gate may be opened to entirely new vistas. As a consequence, the burgeoning demand may press maleic production to larger-scale economies.

The end results could be tremendous.. To cite a single example: each drop in price of maleic anhydride increases the field of soil conditioner application. Whereas at present the cost of conditioners limits them to strip application, the sales potential, given the proper price, is fantastic.

Just how far maleic anhydride producers can up their output depends in some measure upon their ability to improve yields and, in so doing, counterbalance the rising price of benzene. For the cost of their raw material now assumes prime importance (as contrasted with the problem of availability, which haunted producers until recently).

Unfortunately for the consumers, petroleum operations, while making available ever-increasing amounts of benzene, tend to pull the price of coke-oven material up to the higher petroleum source level. This price brake could hamper maleic expansion considerably.

But with interest in such glamorous consumer products as soil conditioners and plant growth regulators now whetted, maleic may now be ready to bid for a place in the front line of major chemicals.

Maleic Anhydride Use Pattern — 1954 estimate

	Millions of Pounds
Coating resins (alkyd)	16.5
Casting and low-pressure laminates (polyester)	9.5
Drying Oils	8
Agricultural chemicals (soil conditioners, plant growth regulators, pesticides, etc.)	5
Plasticizers	3
Other (pharmaceuticals, wetting agents, adhesives, etc.)	3
Total	45

Unofficially, it's a good guess that when National Aniline's Moundsville, W. Va., plant goes on-stream (probably early next year) total U.S. output could reach an easy 60 million lbs.

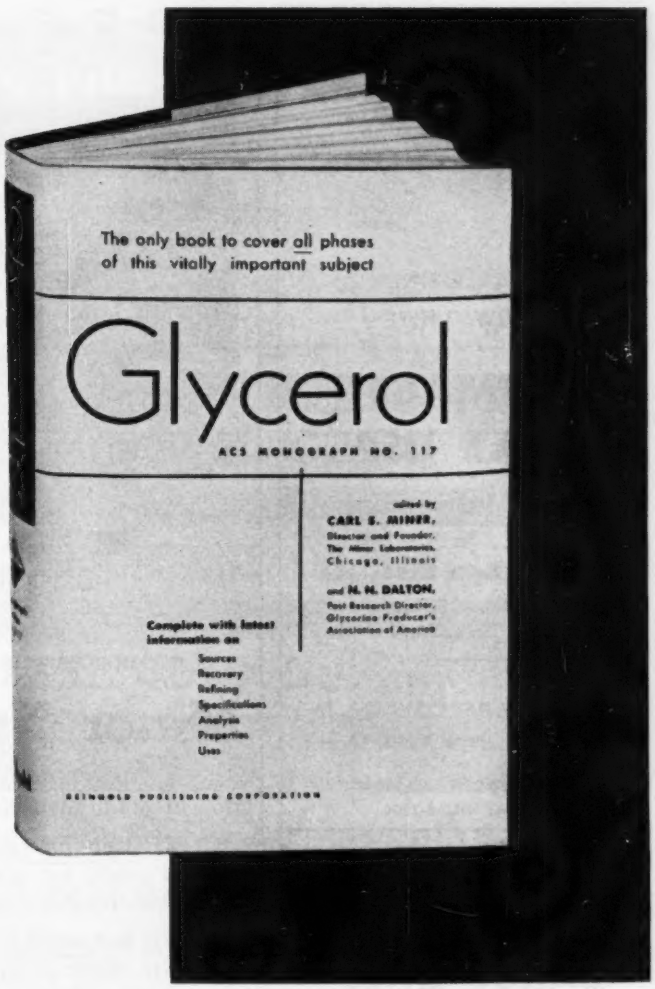
Big two producers today are long-time leader National Aniline, and Monsanto. Together, they are said to account for over two-thirds of entire output. Considerably down the list



Market on Wings

SARAN PLASTIC screening, stuck with vinyl resin to the 116-ft wings of a B-47 Stratojet, peels off easily after serving to protect the surface during assembly at the Lockheed plant at Mariette, Ga. Superior to the paper-and-felt covering formerly used, the plastic fabric costs only $36.20 per wing, labor included, as compared with $52.70 for the paper-and-felt. Other advantages: its translucency permits wing construction markings to remain visible during assembly; toughness resists tearing and it's all salvageable. The vinyl adhesive is dissolved from the saran and the resultant plastic solution reused; the screen is simply allowed to dry before being put back into service.

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4. Recovery and Refining
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MICRONUTRIENT TEST TUBS: A trace makes a difference.

Minor Nutrients Grow Up

It's major play for fertilizer minor elements in promotion of plant foods for the home gardener.

Complexed, or chelated, trace nutrients are getting the biggest push, but glass-like "fritted" trace elements and inorganic water-soluble micronutrient salts are getting attention, too.

Not all the attention's favorable, though. Pacific Coast scientists, wary of chelate efficacy, seek soft-pedaled promotion.

It began in early February, in Florida. Garden Research Laboratories, Inc., a recently spawned merchandising firm in New York, took full-page ads in Miami papers to splash the news of its new water-soluble fertilizer RX-15, which contains trace element complexes of ethylenediamine tetraacetic acid (EDTA).

Since, the promotion campaign has moved north with the growing season, branched into the Southwest and West and will be nationwide soon. And with it has come renewed interest in the value of trace (or minor) elements in fertilization—and in some areas, notably the Pacific Coast, a bitter declaration that the present campaign, on the heels of last year's flamboyant soil-conditioner promotion, could seriously cripple the home agricultural chemical market.

There are a couple of reasons for the negative reception by West Coast farm researchers of ads for chelate-containing fertilizers. The RX-15 promotion makes a vague reference to "plant scientists at a California Agriculture Station," which apparently refers to the work of Jacobson at the Univ. of California's experiment station in Davis, Calif.

It's the opinion at the Davis agriculture station that Jacobson's results are far too incomplete for anyone to launch into free-wheeling promotion of chelates as cure-alls. They feel that the whole question of complexed salts hasn't been thoroughly explored yet, and further point out that though striking results with EDTA complexes have been obtained in Florida's acid soil, attempts to duplicate the results in Western calcarious (alkaline) soils have proved inconclusive at best.

But the major reason for caution, the Californians say, is the limited over-all research on the complexed salts. Although a great deal of experimental work is going on right now on state and federal farms, very few published references are available on the chelates.*

Trail Blazer: It seems pretty clear that the Westerners' prime complaint

* The latest Geigy Bulletin on the Metal Complexes of Sequestrene in Plant Nutrition lists nine publications, but four of these nine are "in press."

A TESTED PROCESS FOR ETHYLENE OXIDE

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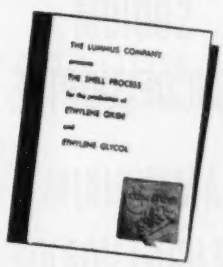
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Now available through The Lummus Company are the Shell Development Company's processes for manufacture of ethylene oxide by direct oxidation of ethylene, and ethylene glycol by the hydration of the ethylene oxide.

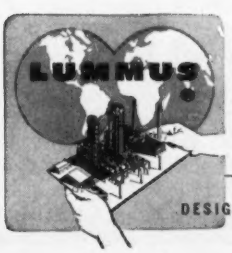
At least five features of this Shell Process are particularly noteworthy:

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Lummus is now prepared to design, engineer and construct Shell Process ethylene oxide and ethylene glycol plants —combining these features with Lummus' more than fifty years of experience in plant design and construction.



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is the overblown verbiage in promotion of RX-15, rather than Garden Research's pioneering use of the chelates. But the temptation to carry advertising to extremes isn't limited to the agriculture chemical field, though Garden Research seems to have been carried away by the prospects of its "first."

Four complexed micronutrients are offered in Garden Research's formulation. Tradenamed Nutragenes, they are organic salts produced by Refined Products, Inc. (Lyndhurst, N.J.), a textile chemical firm. The four salts are of iron, manganese, zinc and copper.

Doggett-Pfeil (Springfield, N.J.), a well-known horticulture supply house, is actually formulating RX-15 for Garden Research,† and also offers chelate-containing products, XL-36 and XL-60, under its own label. D-P readily admits that more research is needed, but feels that as presently used, the chelates can well be helpful; at worst, can do no harm to plants.

Minor Boom: The heavy consumer advertising of RX-15 has more or less overshadowed the use of sequestered micronutrients (by far the greatest part of which are iron chelates) in fruit growing. The Alrose Chemical Co.'s (a Geigy company) Sequestrenes are being sold on both coasts and the Pacific Northwest by Geigy's insecticide division.* Bersworth Chemical Co. (Framingham, Mass.) is moving its Versenes (as sold to growers, the iron complex is tabbed Ferrogreen) not only to citrus growers, but growers nationwide. Antara Chemicals (Div. of General Dyestuff Corp.) has so far refrained from selling to growers, but is considering taking a supply-the-fertilizer-maker position; Refined Products is currently just supplying to home fertilizer makers (others indicate interest here, too), may broaden outlets soon.

The EDTA makers have been wary of plunging into selling the complexes directly to the farmer or gardener. They're aware of the incomplete data. And minor-element shortages appear to vary from region to region, state to state, even field to field. There's only an occasional generalization: Florida, for example, has soils that are iron-deficient, resulting in frequent "iron chlorosis" damage to citrus trees.

Shotgun Approach: Because of the widely varied differences in micronutrient distribution, it has been the case generally to use the "shotgun" technique—apply all the known nutrients, whether or not there is a specific shortage. This has long been the procedure with nearly all the soluble fertilizers for the backyard farmer (*CW, July 19, '52*), and it's the case with RX-15.

It's also the technique used by the Ferro Corp. (Cleveland) with its Fritted Trace Elements (F.T.E.). Introduced last year on experimental scale (*CW, May 3, '52*), F.T.E. has gone into commercial production this year. These frits are soluble salts in a finely powdered, glass-like material. As the frit weathers, the soluble salts are slowly released to the plants. Six elements are provided, copper, manganese, iron, molybdenum, zinc and boron.

Ferro Enamels (Canada) Ltd. (Oakville, Ont.) has just gone into production of these frits, which will be distributed by the agriculture chemicals department of Canadian Industries, Ltd. Outside of the hazard in handling any finely powdered glass, trace elements in the fritted form are easy to use. Currently, only Du Pont is selling a home-garden type of fertilizer with F.T.E.

Tennessee Earnest: Another major producer in trace nutrient manufacture, the Tennessee Corp. (Atlanta, Ga). is enthusiastic about its "neutralized" forms of trace elements. It's building a $1-million plant outside Atlanta due onstream early in 1954) for manufacture of fertilizer manganese salts, as well as a 10 ton/day capacity for the new chemicals. The new products (e.g., Nu Z, the zinc compound) are dusts, to be applied to the foliage. They are said to be insoluble in water, but soluble in the acids the plants exude. Typical iron powder is 30% metallic content.

Tennessee claims a definite price advantage over competitive forms of trace elements. Typical price for Nu Z is $13.50 for 100 lbs. in quantity. A chelated zinc (11.5% metallic zinc), in quantity, is about $75 per hundredweight now, with prices likely to drop if and when they really catch on. The F.T.E. is about $11.60 per hundredweight. All interested parties emphasize, however, that because of differences in actions, and dosages, comparisons are exceedingly hard to make.

However the trace elements are to be applied, there appears to be a fat market for them. The shortages are far from limited to the U.S. And the U.S. market for fertilizers alone is $880 million yearly; fortifying them with traces could be a tidy business.

† Garden Research was formed by executives of Doggett-Pfeil and of the Huber Hoge advertising agency.

* Sequestrene NAFe, ferric complex is 12% iron as metallic, the zinc complex about 14% metal, the cupric 13%, the calcium 8.5%, the manganese 12%, the magnesium 5.5%. Prices vary, depending upon the cost of the element to be complexed.



Special Dracco Filter solved tough dust control problem at plastics plant. Rotary feeders on hoppers (shown here) discharge dust at pre-determined rate.

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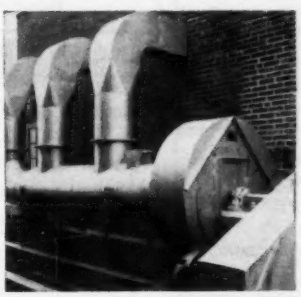
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SPECIALTIES . . . . .

Gardners' Special

Another farm chemical, an insecticide, is also in the news this week. American Cyanamid's malathon is making its debut now in garden supply stores in a variety of home-use formulations. Malathon, an organo phosphate compound (0,0-dimethyl dithiophosphate of diethyl mercapto succinate) related to TEPP and parathion, has, nevertheless, shown much lower toxicity to animals than its cousins. Said to be safe enough for any backyard farmer, it is also said to disappear quickly from treated fruits and vegatables, so that there is little danger of contamination.

The real key to an insecticide's value, however, is its effectiveness against pests—and malathon has shown value in control of aphids, mites, scales, beetles, white flies, and a host of other bugs. An extra plus, Cyanamid says, is that malathon retains its effectiveness, is good against insecticide-resistant pests.

Dusts and emulsifiable concentrates are available to the gardener; they are recommended for nearly all popular food crops. Cyanamid is not selling malathon in its own formulations; it is incorporated in the products of other formulators.

New Standards

The U.S. Dept. of Commerce and a chemical specialty maker tangled recently—and the specialty maker came out on top. At least that's the way some observers regard the firing last week of Dr. Allen V. Astin, director of the USDC's National Bureau of Standards.

In brief, the developments of the past week are these: Last Tuesday, Secretary of Commerce Sinclair Weeks demanded that Astin resign, implying that NBS was not being entirely objective in its testing and scientific work. In particular, Weeks felt NBS hadn't been objective in testing battery additive AD-X2, made by Jesse Ritchie's Pioneer Chemical Co., Oakland, Calif. (*CW, Sept. 22, '51*).

Tied in with the firing of Astin, Secretary Weeks also ordered withdrawal of a mail fraud order against Pioneer.

The removal of Astin, a 20-year man with NBS and highly regarded in scientific circles, came somewhat as a shocker to fellow scientists. But Week's comment that his department's "skirts were not entirely clean"—he meant NBS—came as an even greater surprise. The integrity of the bureau and its work has never before been questioned. It has been considered

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SPECIALTIES . . . . .

one of the top research groups of the nation, and boosted its stature during the last war with developments such as the proximity fuse.

Long Haul Winner: Nevertheless, Ritchie has been sniping at the Bureau since 1948, when his AD-X2 was included among the battery additives deemed worthless by NBS. Ritchie prepared a 20-page history of allegedly unobjective testing by the Bureau, strongly implied that the electrochemical division of NBS was influenced by battery manufacturers. The history was given to the Senate's Small Business Committee, and was made available to interested publications.

Apparently, Ritchie has now all but won his major objectives. The reorganized NBS is to re-examine AD-X2; previous publications concerning battery additives have been withdrawn; the fraud order has been removed. The question now: can the overhauled NBS support the claims that Ritchie has made? He backs his with five years' successful AD-X2 selling, plus test results that include a pair of favorable reports from Massachusetts Inst. of Tech. and Catholic Univ. (Washington, D.C.).

•

Pinch of Caution: EQ-53 is no cure-all, the U.S. Department of Agriculture warns of its recently developed specialty, a mothproofing rinse for woolens. The new product, which will be introduced to consumers next month, is designed only for woolens that can be laundered—it is not recommended for use on furs, suits, coats and other woolens that cannot be washed.

•

Angle for Anglers: The Zonolite Co. (Chicago) is suggesting "worm farming" as an additional use for its vermiculite. Fishermen who wish to have a good supply of angle worms are advised to work a portion of the backyard to the depth of about 10 inches, sprinkle coffee grounds over the top, add a lemon peel or two, then cover with vermiculite. In a short time, there's a good supply of fat, live bait just under the insulating cover.

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Super Size: American Cyanamid Co. is selling a new synthetic paper sizing material, Cyron, claimed to permit manufacture of papers of unique qualities—papers extremely resistant to alkaline materials. Cyron is suggested as a beater additive, is fixed in paper under alkaline conditions. Application is possible without rosin or alum or wax, but for added effect Cyron can be applied to surfaces of rosin sized papers.

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Flash Point (COC)	340°F
Ash	0.005%

Shipped in 55-gallon drums equipped with Tri-Sure Closures.

WITCO Dibutyl Phthalate*—a stable, colorless and odorless ester—is compatible in all proportions with cellulose nitrate and has high solvent power for cellulose mixed esters and other synthetic resins. Its high efficiency and compatibility have led to widespread adoption. *Write for Technical Service Report E-4.*

*Made in Witco's Chicago plant.



Ask to have our Technical Service Representative call.

WITCO CHEMICAL COMPANY

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